A CULTURAL AND ENVIRONMENTAL OVERVIEW OF THE PREHISTORY OF MARYLAND'S LOWER EASTERN SHORE BASED UPON A STUDY OF SELECTED ARTIFACT COLLECTIONS

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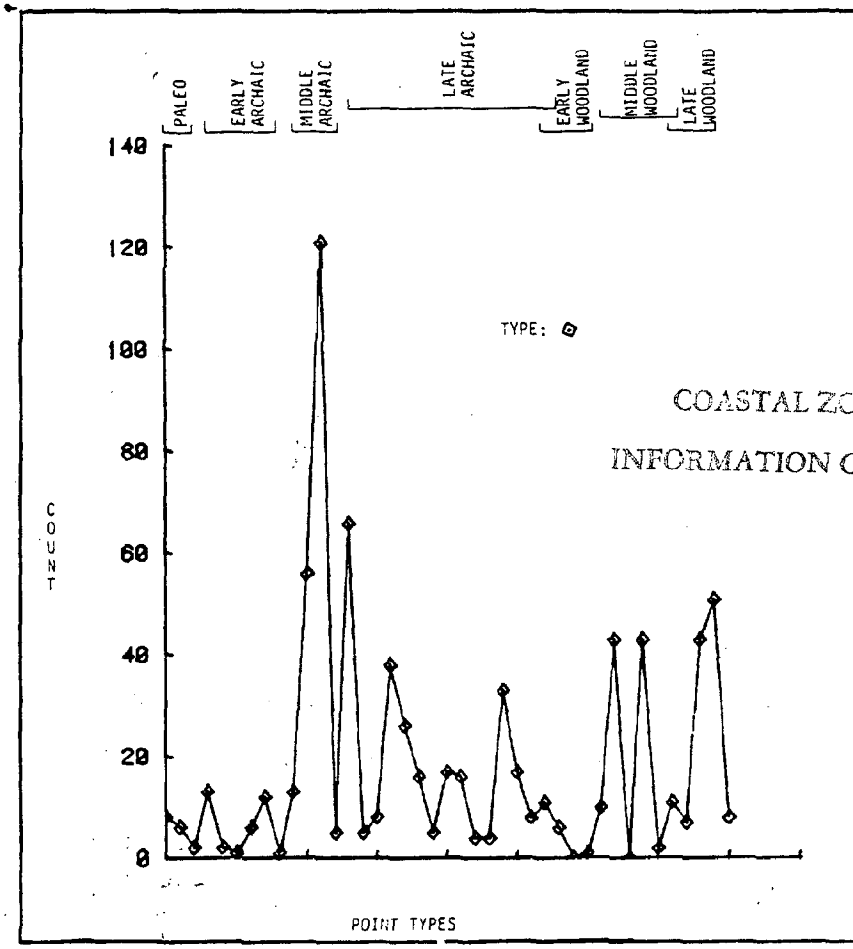

BY

RICHARD B. HUGHES

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Prepared for:

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The Tidewater Administration
Maryland Department of Natural Resources
Coastal Resources Division
Annapolis, Maryland

1980

A PRELIMINARY CULTURAL AND ENVIRONMENTAL OVERVIEW OF THE PREHISTORY OF MARYLAND'S LOWER EASTERN SHORE BASED UPON A SURVEY OF SELECTED ARTIFACT COLLECTIONS FROM THE AREA

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Coastal Resources Division
Annapolis, Maryland

1980

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October 14, 1982

To The Reader:

Attached, please find a copy of a new report, A Cultural and Environmental Overview of the Prehistory of Maryland's Lower Eastern Shore, which was produced as a part of the Maryland Coastal Zone Management Program student internship program.

This research, conducted by Richard Hughes in the summer of 1980 under the supervision of the Maryland Historical Trust, represents a synthesis of known information on the archeology of Maryland's Lower Eastern Shore. The work of early archeological research pioneers as well as the invaluable data provided by the activities of numerous avocational archeologists has been used to create a firm foundation of knowledge upon which future research in the region can be built.

This study, as presented here, is still in preliminary draft form, with final additions and revisions yet to be made. It is felt, however, that the information provided by this work is of such significance for an area which has in the past received scant attention to archeological resources, that the information should be distributed to interested parties at this state of preparation. Due to the current document's preliminary nature, comments and suggestions are solicited so that they may be incorporated into the final document.

Please send comments to:

Wayne Clark, State Administration of Archaeology
Md. Historical Trust
21 State Circle
Annapolis, Maryland 21401

Sincerely,

Dr. Sarah J. Taylor
Director Coastal Resources Division

SJT:CZ:gvs
Attachment

ACKNOWLEDGEMENTS:

It has been my great pleasure to have had the opportunity to work these past months on the preparation of this research report; a report which I hope will at least represent a first step toward gaining a better understanding of the fascinating prehistory of Maryland's lower Eastern Shore.

The funding of the Summer Intern Archaeological Program by the Tidewater Administration, Coastal Zone Management Unit of the Department of Natural Resources, Annapolis, Maryland, represents a deep commitment to preserve and understand the only evidence which remains of how man lived on Maryland's Eastern Shore for all but 350 of at least the last 12,000 years. The help of Mr. Wayne Clark of the Maryland Historical Trust in arranging and administering this funding is deeply appreciated. Mr. Clark's guidance and advice during all stage of this research has been absolutely invaluable. Dr. K.-Peter Lade of Salisbury State College and the Lower Delmarva Regional Center for Archaeology has also given most freely and unselfishly of both his extensive knowledge of the prehistory of the area and, far above and beyond the call of duty, countless hours from his busy schedule. Without the help and advice provided by Dr. Thomas E. Davidson of the Lower Eastern Shore Regional Preservation Office at Salisbury State College this report would not have been possible and I wish to thank him for this and for the many hours he shared with me studying collections during the hottest summer in one hundred years.

My very warmest thanks go to the many people who shared both their collections and their amazingly wide-ranging knowledge of the study area with me. This report is truly the result of their generous contributions. I cannot possibly name all who helped me this summer, but I would particularly like to thank Mr. and Mrs. Robert Filmer, Mr. and Mrs. Willis Messick, Mr. Bill Wilson, Mr. and Mrs. Frank Hirst, Mr. and Mrs. Joseph Fehrer, Dr. Robert McFarlin, Mr. Chuck Fithian, Mr. Robert Delano, Mr. and Mrs. Brice Pusey, Mrs. Royce Beauchamp and Mr. Michael Vaeth. Barbara Mason's help with the many little details is especially appreciated. The high level of dedication and conscienciousness which these people exhibit makes the term amateur archaeologist totally inappropriate.

I also wish to express my most sincere appreciation to the faculty and staff of Salisbury State College for their provision of working space and supplies, as well as all the very generously given advice and aid in matters that at times seemed beyond my comprehension.

Finally, many thanks to Laurie Cameron Steponaitis who preceeded me in this type of study, providing me with a wealth of research on which to draw and most of all with the model on which this study is based.

ABSTRACT:

Maryland's lower Eastern Shore counties of Wicomico, Somerset and Worcester at present represent a rather unique archaeological phenomenon. These counties include an area which is known to have been intensively occupied from Paleoindian times (circa 12,000 B.P.) to the present, yet it is also an area which has remained largely rural and unspoiled by development. Unfortunately, this situation is now rapidly changing. The Atlantic coastal area has become the resort of numerous large urban areas within easy commuting distance, the city of Salisbury is experiencing a building boom which shows no sign of easing and the completion of the Norfolk Harbor-Tunnel has turned the Delmarva Peninsula into a major north-south throughway with the concomitant growth of all towns along this route. This report is an attempt to face these land development stresses by providing a framework upon which future systematic archaeological surveys can build. The report is the result of a thorough examination of the available published literature and the study of a number of major artifact collections from the area. The perspective of this report is based upon a view of the study area as it relates to the Delmarva Peninsula, the Chesapeake Bay region as a whole, and to the Middle Atlantic region of the Eastern United States.

Topics covered include; a review of previous research; the development of a preliminary chronological sequence; a review of the modern macro-environmental and micro-environmental setting and its probable

changes through time; a synthesis of the data as it pertains to artifact inventories, settlement patterns and economic behavior; and finally the integration of this data to define a number of archaeologically critical areas where particularly high levels of cultural resources are and should be found.

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INTRODUCTION: SURVEY AIMS AND METHODOLOGY

Beginning in June, 1980, and continuing through the summer, a study was conducted of existing archaeological artifact collections from Wicomico, Worcester and Somerset counties on Maryland's Lower Eastern Shore. The project was funded by the Summer Intern Program of the Tidewater Administration, Maryland Department of Natural Resources, Coastal Resources Division, and was administered by the Maryland Historical Trust.

The lowest three counties of the Eastern Shore of Maryland lie within the Delmarva peninsula which is part of the larger Chesapeake and Atlantic coastal region (Figure 1). The study area is bounded on the north by the Nanticoke River and the state of Delaware, to the west by the Chesapeake Bay, to the east by the Atlantic Ocean, and to the south by the Virginia counties of the Delmarva peninsula (see Figure 2).

The three counties were selected for study based upon three important factors:

First, the physiography of the region forms a well defined natural unit which encompasses the three main landforms of the Eastern Shore coastal plain: the beach or coastline; the tidal marsh; and the mainland or coastal plain proper. It was felt that the three counties formed a natural transect which would include all of the possible en-

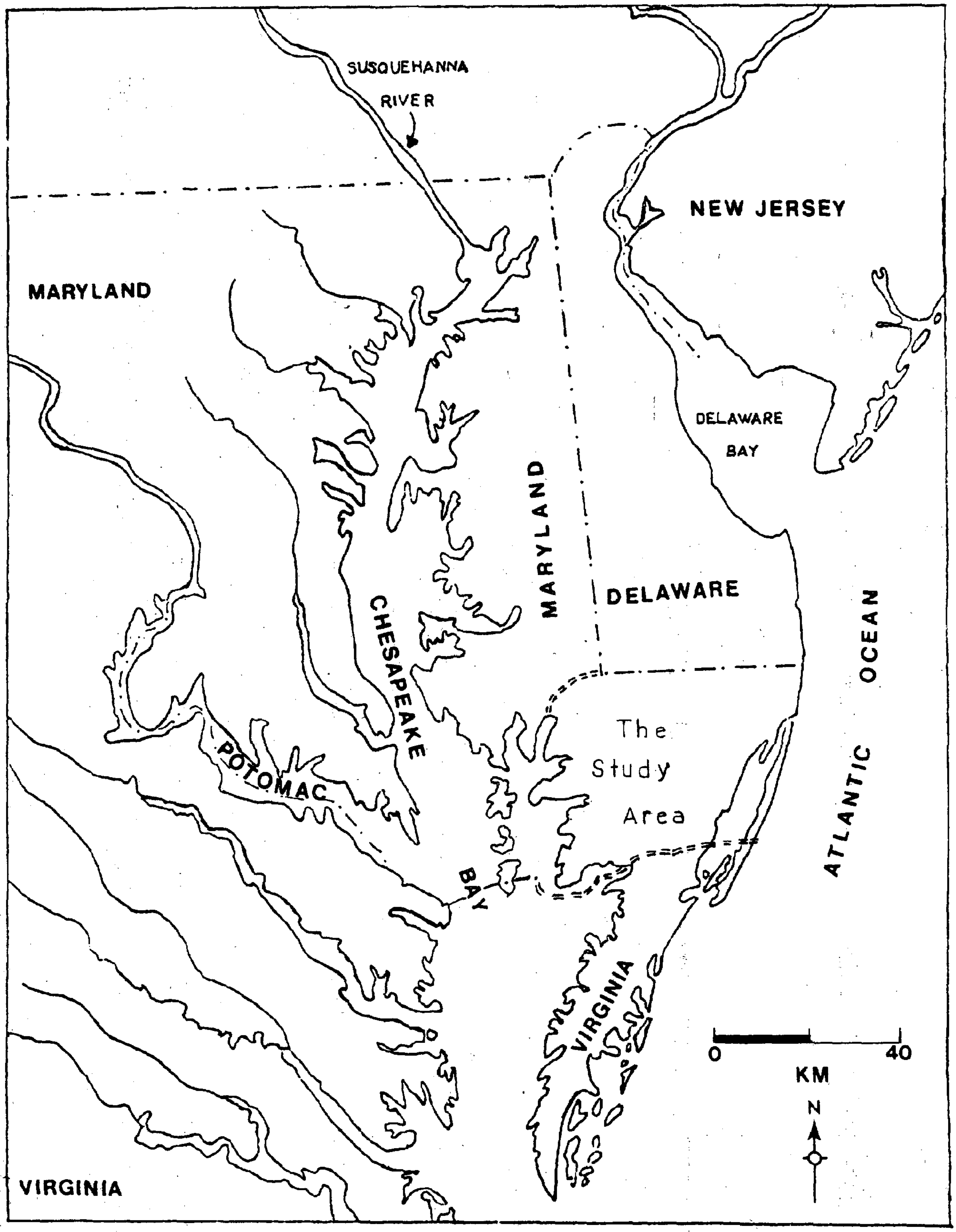

Figure 1: The Chesapeake Bay Region

vironmental zones in which human adaptation would have taken place on the lower Eastern Shore. The documenting of the known cultural resources of this area in an informed manner, which is the primary purpose of this report, represents a first step towards fulfilling a systematically applied program of multi-disciplinary research aimed at understanding the prehistory and history of the lower Delmarva Peninsula, and in turn of the entire Chesapeake and Atlantic region.

Second, the management and preservation of the cultural resources of the area is becoming more imperative every year as a once largely isolated and undeveloped agricultural area comes under increasing developmental pressure from surrounding urban areas as a result of its own natural and environmental resources. The Atlantic coastal area has undergone astounding development, especially around Ocean City as it provides the closest coastal resort beaches to the Washington D.C. area. The city of Salisbury in the central coastal plain has grown dramatically in the last decade and has prospects of even further expansion as it comes to serve as the central industrial and business center of the Eastern Shore. The possibility of oil exploitation off of the Atlantic coast could provide impetus for an especially rapid development in many parts of the study area.

Last, the establishment of the Lower Delmarva Regional Preservation Center of the Maryland Historical Trust in Salisbury offers the opportunity to combine the work of cultural resource management and preservation with that of ongoing archaeological research programs in the lower counties. The Center offers excellent facilities for the application of a program involving systematic fieldwork, laboratory research

THE STUDY AREA

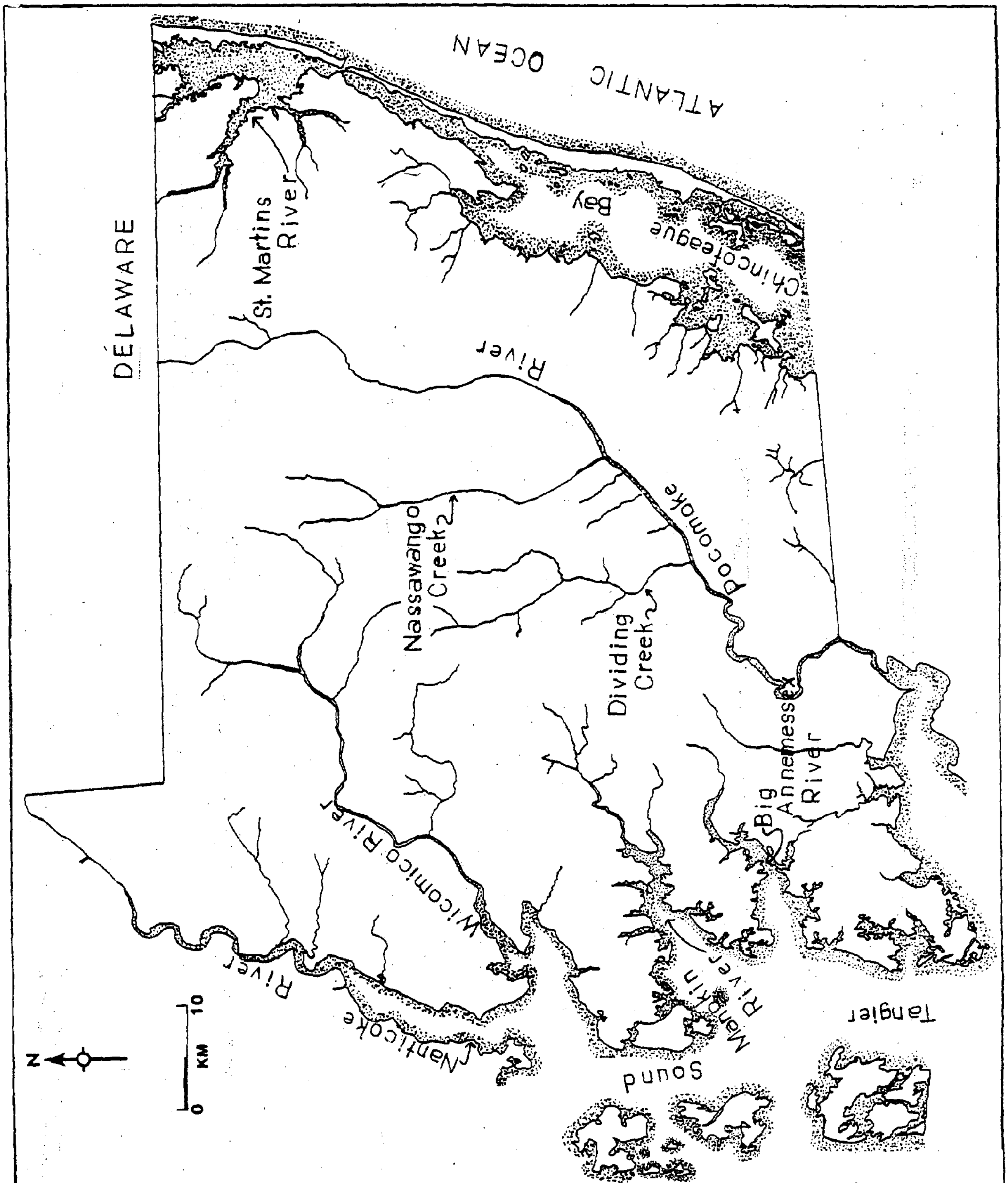

Figure 2 : The Study Area

and a multi-disciplinary approach to the cultural resources of the area.

This report will hopefully serve to establish a base of data upon which future research may draw and upon which some preliminary management decisions may be made.

In order to do this, this report will concentrate upon the construction of a preliminary artifact classification system, the presentation of a spatio-temporal distribution of artifacts and sites, and the identification of critical areas for the fulfillment of management and research goals in the region.

The methodology which was applied to answering the aims of this report was basically a three step questioning process.

The initial procedure was to discover just what was in the artifact collections by examining them firsthand. The artifacts were compared to known types from surrounding areas as far afield as New York and as close as Delaware (for example, see Ritchie 1961, Coe 1964, Artusy 1977) in order to establish some sort of baseline for comparison. This was done with the full knowledge that such comparisons can never provide conclusive associations for artifacts which may resemble similarly appearing material from sites often many states away, but until carefully controlled excavation of selected sites provides a better framework for reference, analogies will have to be drawn to known artifact typologies and chronologies.

The second step was to carefully analyze where the artifacts in the collections were being picked up. This was done in order to ascertain if any dominant trends would emerge for the different time periods in relation to environment, resources or other factors.

Last, based largely upon answers to the first two questions, an attempt was made to make some statements about where we may logically expect further sites during the various time periods to be located in areas where no sites are currently known. This was done based upon environmental knowledge, location of resource areas and distribution of known sites. Additionally, some very preliminary test research was applied to the question of site location prediction by the application of aerial photographic data and Landsat orbiting earth resources satellite data.

It is hoped that these research methods may be applicable to areas outside of the lower Eastern Shore as well as to the current research area.

CHAPTER I: PREVIOUS RESEARCH

Considering the rich and varied archaeological data base which exists on the lower Eastern Shore of Maryland, it is perhaps surprising that the region is notable for an almost total lack of early systematic professional research.

The earliest reference to a prehistoric archaeological site occurs on a map published in the Geological Survey Annual Report of 1835 by the geologist J. T. Ducatel. His map indentifies the location of shell middens in Somerset County at Long Point near Dames Quarter and on the Manokin River near Revelle's Neck. He also locates shell middens just above the study area in Dorchester county at Horn Point near Cambridge and in the vicinity of Hurlock.

Henry C. Mercer (1897) discussed the digging of an Indian ossuary in nearby Dorchester county in the year 1897 and W. H. Holmes makes passing mention of the region around the turn of the century, but by and large professional archaeological investigation remained at the level described by D. S. Davidson in 1934 when he stated that the area was an archaeological terra incognita (1934).

In all of the early published works on the area the cultural chronology remained confused and very poorly defined at best and a concern with constructing such a chronology has to a large extent continued to be a prime factor in work performed thoughout the entire Delmarva region.

The construction of a broad cultural synthesis based upon a better understanding of the Woodland period has marked the work of most later professional archaeologists working in the region (Griffith 1977, 1980; Thomas 1974 ; Wise 1975).

By far the greatest amount of work done in the study area until very recently has been by local amateurs and para-professionals. Extensive collections based on material derived from exposed land surfaces and eroding shorelines have been assembled. Some articles have been published on this material (Messick 1967; Cresthull 1971; Brown 1979), but most of the material has remained unstudied. Certain problems arise in dealing with such collections which can make working with them difficult. Sample bias is present in the differential selection of projectile points and ground stone items over other classes of prehistoric material. Poor recording of artifact provenience also can make such collections of little research value. Secrecy about exact site location by dubious collectors can act to impede useful study of collections. Even the most thorough and cooperative collectors never overcome the problems associated with shallow, multi-component sites which have been surface collected in an unsystematic fashion. This seems to be the most common type of site occurring within the study area.

Since the enactment of cultural resource management legislation, contract archaeological work has been increasingly performed within the study area (for example see: Bastian 1971, Conrad 1976, Curry 1978, Epperson 1980, Gardner 1976, Israel 1978, McNamara 1977 & 1977a, McNett 1978, Thomas 1976 & 1977). The majority of these reports are on file at the Office of Archaeology, Maryland Geological Survey in Baltimore. The contract work which has been done in the area gives a clearer pict-ure of environmental and cultural development in small selected areas, but of necessity such work is restricted in focus and does not deal in great depth with the overall prehistory of the region.

Work which has been done on a larger scale regional basis has primarily taken place in Delaware under the auspices of the Delaware Division of Archaeology (Thomas 1974, Lewis 1971, Wise 1975). One larger scale overview directed to management purposes has been presented dealing with the Eastern Shore of Maryland (Wilke & Thompson 1974).

Work at Catholic University and in Delaware has produced some attempts to construct and test models of settlement and subsistence patterns on the Delmarva Peninsula (Gardner 1978 & 1979, Thomas et al. 1975). This type of work particularly within Maryland, has suffered from a lack of sufficient data. Hopefully this problem will be remedied as more work is conducted in the future.

CHAPTER II: ARTIFACT CLASSIFICATION SYSTEM

Since the earliest days of archaeological study, archaeologists have classified their cultural material into categories. The reason for doing this is that categories serve to condense the sometimes overwhelming mass of material information into a more useful and workable form. Additionally, the categories allow the archaeologist to more easily see the variability present in the assemblage he is examining and it also provides a means of at least attempting to compare artifacts in a meaningful manner from diverse locations.

One can create categories of artifacts based upon numerous lines of inquiry. For example, with lithic material the categories can be devised according to technique of manufacture, function, or morphology. Ceramics and other materials present slightly different but similar problems. All of these have been used to construct classificatory systems, but the basic one which has been and still continues to be preeminently used for lithic material is classification based upon morphology or the form of the finished artifact. For ceramics, certain other variables such as method of decoration have been used in construction of classificatory systems.

When a classification system was being devised for this study certain special characteristics of the collections had to be kept in mind. The major influence to be accounted for was the preferential selection by collectors of projectile points and secondarily ceramics from the surface of sites. This factor means that the archaeologist is not seeing the total range of artifacts from the site nor is he getting a true picture of the frequency with which artifacts are occuring in the total artifact population. A second important consideration is the fact that the majority of collected sites are shallow, multi-component scatters in which it is all but impossible to separate out non-temporally diagnostic artifacts by component. Without clear stratigraphic context, a flake or a broken projectile point tip could just as easily date to Paeloindian times as to the Late Woodland. The end result of these two considerations is that any classification system used would have to primarily deal with projectile points and secondarily, at least for the Woodland period, with ceramics. Bias in collection had largely eliminated most other material and the nature of the sites involved made much of what may have been picked up in addition to points and ceramics useless. These factors also dictate what questions one can best ask of such material. For instance, trying to assess the different functions carried out within or between sites would be useless as the collected material would only represent a small part of the total activities carried out at a site. The only real questions which could meaningfully be addressed based on the available collections had to deal with site distribution through time. In order to best do this, rather gross categories of artifacts were constructed which focused primarily upon temporally diagnostic material. This study has steered clear of making any functional assessments for use in devising categories. This is based upon this author's and other's (for example, Odell

1977, Ahler 1970, Keeley 1977) experimental research into the damage that accrues to stone tools through utilization and the application of this knowledge to prehistoric stone tool assemblages. The evidence of these studies is very clear that while in some assemblages at certain times some morphological groups do indeed fit the function denoted to them by their type names, others most certainly do not fit. Often one type will have been used for a function (or functions) very different from what its name would imply. The morphological group projectile points is a classic example. These "points" when examined were often used for other purposes entirely such as cutting, boring or scraping. With this in mind, this report will conceive of morphological and functional types as separate entities for the purpose of data recording and analysis. If desired, further work could be done along these lines at a later time when more systematic survey or excavation has been done.

LITHICS

In order to address the primary question of site distribution through time, a basic lithic material classification was constructed which divided the material into two basic classes of chipped stone and ground stone. A major dichotomy was made for the chipped stone assemblage based on whether a piece was retouched or non-retouched. Retouch was defined as any secondary modification (i.e. removals) of stone, for whatever purpose, that can be demonstrated to have been of prehistoric human origin. This includes both thinning and edge retouch modification. Non-retouched is any piece which does not meet the above criteria. Ground stone to be considered as belonging in a type category must show features such as grinding, pecking, battering, polish or any other evidence of prehistoric human modification.

Raw material used in manufacture was also considered for all lithic artifacts. Raw material selection varied over time so this can be an important factor in indicating the dating of a particular artifact.

The basic descriptive system which was employed on the chipped stone artifacts was based upon the work of Errett Callahan (1979) on biface reduction. This is a very up-to-date and workable system which presents a series of reduction stages in the construction of a chipped stone artifact. Five stages are presented from obtaining the raw material to final production of a shaped piece. This interest in biface technological reduction stages is necessary as practically all chipped stone artifacts and projectile points in particular fit into the reduction sequence somewhere and any variability noted can have important cultural implications. A basic guide to the reduction sequence can be found in Callahan (1979) on pages 10 and 11.

The most important chipped stone class for the purposes of this report is projectile points. These are defined as all finished bifaces and unifaces with symmetrical edges converging to a point. All basal elements showing hafting modification were also included but finished tips were not. The category of projectile points was further subdivided into types based upon morphological features. The chronological assignment of these projectile point types will be discussed in the next section.

Further division of the chipped stone category included items thought to possess the most likelihood for having temporal implications and for being the most likely to have been collected. These include:

Scrapers - any steeply retouched unifacial or bifacial tool where the edge and not a projection (i.e. drill) is the area of retouch. These are rarely bifacial and the side opposite the steep retouch is usually flat.

Drills - a tool with a pronounced, roughly parallel-sided, projection the length of which is at least one third of the total length of the piece. This projection is bifacially retouched and rhomboid to circular in cross-section. A hafting element may be present and may serve as a basis for further typological subdivision.

Celt - a general term which includes axes, gouges, hoes, adzes and any other morphological type that is bifacially shaped and possesses a transverse cutting edge on one end. The cross-section may be round, lenticular, ovoid, plano-convex or rectangular. This category is especially useful for fragments of larger tools that can be determined to belong in one of the above stated categories, but that lack the features necessary for inclusion in any particular one. The subtypes of celts are defined thus:

Axe - a bifacially worked piece that possesses a defined cutting edge on one of the ends. This cutting edge is symmetrically placed with regard to the cross section, and both surfaces that lead to the bit are convex and bevelled to about the same degree. Axes that possess a notch or groove chipped or pecked into the side(s) constitute a subtype called "grooved axes."

Adze - a bifacially worked piece that may occur in a variety of forms (e.g. lenticular, rectangular, trapezoidal). Its principal characteristics occur on the bit, which is straight or slightly curved and asymmetrically beveled (though the piece is bifacially worked). The sides and butt end may be crushed and abraded in the manufacturing process.

Gouge - a bifacially retouched celt on which the transverse edge possesses a pronounced curvature. The surfaces leading to the bit usually show asymmetrical beveling like an adze, but the curvature of the edge is more extreme.

Burin - a flake, blade or blocky piece at least one corner of which has been produced by a blow struck transversely to the edge or surface that serves as the striking platform. The resulting burin point is often dihedral, but can also be trihedral. The burin spall that is detached may have a series of flake scars down its dorsal ridge, but only if the tool manufacturer decided to use "stop retouch" to terminate the spall at some point. Terminal retouch though, is not necessary to removal of the burin spall. The surface that served as the striking platform for the burin removal must be relatively flat, formed by a natural surface, scar negative, broken edge, or intentional retouch.

Graver - broad and flat projections from the edge of a tool blank. Usually worked unifacially, the working portion of the tool is made by crushing and flaking away part of the original edge on either side of the central area between two and five millimeters wide. This projection must actually reach outward from the piece in such a way that it is a dominant part of the object, as opposed to an area left between two depressions in a notched piece which could never have adequately served a graving function.

Blades - flakes where the edges are roughly parallel. There is at least one dorsal ridge and the length is at least twice the width.

Biface - all bifacially retouched tools not included in one of the above categories.

Uniface - all unifacially retouched tools not included in one of the above categories.*

Ground stone categories included:

Pipes - a smoking apparatus or sucking tube made of stone or fired clay. May be intricately carved or decorated.

Celt - a hard stone tool shaped by grinding and pecking. Both axes and adzes fall into this category and are distinguished by the form of the bit. Any item for which a working edge is not obvious was called a celt. Subtype definitions:

Axe - a symmetrically bitted form. It need not be grooved, although three-quarter and fully-grooved types were recognized.

Adze - Ground stone adzes have one flat face and an opposing convex face. The bit is asymmetrically beveled.

Gouge - an edged groundstone with a bit which is scooped out in cross-section.

Pestle - generally oblong, rounded stone forms usually possessing a flat bottom. Pestles are usually pecked to one of

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* The question of whether a tool type is bifacially or unifacially retouched was determined by examining the working edge of the tool. If the edge is bifacially worked, then it was considered a biface. If the edge was unifacially worked, then it was considered a uniface. This means that it is possible to have two areas of unifacial retouch on opposite sides of the same tool and the item was considered as a unifacial tool. Only if bifacial retouch occurred simultaneously along one edge was the tool called a biface.

three shapes: conical pestles, bell-shaped pestles and cylindrical pestles.

Bannerstone - a class of ground and often highly polished stone shapes with long, parallel sided drilled hafting hole. The hafting hole runs parallel to the axis of symmetry. Many geometric forms are seen: biconvex, bilobed, butterfly, bicrescent, etc. Other forms, especially elbow or L-shaped forms have a single projection from an otherwise cylindrical or rectangular segment through which is bored the hafting hole.

Gorget - a class of thin rectangular to oval to geometric forms with one, and usually two or occasionally more holes drilled along the midline of the longer dimension.

Mano - a class of selected, flat stones exhibiting planar wear patterns. They possess at least one flat to convex face exhibiting these patterns. These include unifacial, bifacial, pitted and, bipitted forms.

Metate - large hardstone, sandstone or other stone slabs which have broad, shallow, usually concave abraded surfaces. Types include slab, dish, channel, basin.

Bowl - generally a steatite. Should be bowl-shaped and should lack peck marks in the bottom indicating use as a mortar.

Mortar - specialized pulverization-catch basin tool which is the passive agent in combination with a pestle.

Bead - any small, drilled or naturally perforated, item from tubular to irregular lumps.

Abrader - a tool possessing a groove, striations or face that is smoother and/or more polished than other faces of the artifact.

Any item which did not fit in one of the listed classes given above for either chipped stone or ground stone yet showing retouch was listed separately and described.

Non-Retouched:

Non-retouched material included all pieces which showed no visible evidence of secondary modification. The terms debris, debitage and waste were avoided at this stage of analysis. These terms connote prehistoric intent in situations in which intent has not been demonstrated. We have all seen unretouched flakes with undoubted traces of use on them, so what are they to be called - "utilized waste"? This would be a contradictory use at best. Often flakes with no visible traces of use as a tool are later seen to have indeed been used as such when viewed under a microscope by a trained observer, so until a thorough microwear analysis is performed on what little unretouched material was present, this study avoided the use of these terms.

CERAMICS

Ceramic material was classified based upon types identified by other studies for the Middle Atlantic region (Stephenson and Ferguson 1963, McNett and Gardner 1975, Wright 1973, Artusy 1977 and Griffith

1977, 1980). Attributes of tempering material, paste, surface treatment, thickness and technology were used to classify sherds. The characteristics used to identify expected and found ceramic types are listed below. Chronological data will be given in the next section.

Ware Plain -

a hand-molded ware with a flat base and undecorated smoothed exterior. Temper is either crushed quartz, sand or limestone (Wise 1975). Very uncommon on the Delmarva peninsula.

Marcey Creek Plain-

a hand molded ware with a flat bottom often showing mat impressions. Wall thickness from 7 - 14 millimeters (Wise 1975, Artusy 1977, Evans 1955). Crushed steatite (soapstone) temper which gives a characteristic soapy texture and feel. Shapes similar to earlier carved steatite vessels. Distributed from Virginia to Upper Delaware (Stephenson & Ferguson 1963).

Selden Island-

coiled construction and conoidal in shape unlike earlier molded wares (Wise 1975, Artusy 1977). Steatite tempered cord impressing. Distributed in coastal and piedmont Virginia, Maryland, Delaware and up the Susquehanna River into Pennsylvania.

Dames Quarter Black Stone-

a flat bottomed ware with a coiled base. Exterior surface is generally smooth, but cord and fabric impressed marking is known. It is thick and heavily tempered with crushed black stone (hornblende?). As presently known, the ware is a localized type in Somerset County, Maryland, with scattered occurrences in southern Delaware and up as far north as Dover (Wise 1975, Artusy 1977).

Wolfe Neck Ware-

two types are defined, Wolfe Neck Cord-Marked and Wolfe-Neck Net-Impressed. Constructed by coiling probably associated paddle-and-anvil technique. Temper is crushed quartz with wall thickness ranging from 6 - 14 millimeters. Shape is conoidal with direct rims and smooth rounded lips. Wolfe Neck Ware is similar to many ware types found throughout the Mid-Atlantic including both the piedmont and coastal areas. Its own distribution area includes the Eastern Shore of Maryland into Delaware as far north as the piedmont (Giffith and Artusy 1977, Lewis 1972).

Coulbourn Ware-

two types are defined, Coulbourn Cord-Marked and Coulbourn Net-Impressed. Interior surface treatment ranges from scraped through smooth over scraped to completely smooth. Approximately one-third of the Net-Impressed variety displays interior net impressions. Thickness ranges from 7 - 14 millimeters. Paddle-and-anvil technique on coiling is indicated. No obvious temper is present other than pieces of fired clay or crushed ceramic sherds. Shape is conoidal with a direct rim. Lips are round and smooth or flattened with either cord or net impressions. The ware is spatially distributed in much the same area as Wolfe Neck Ware with a mention of Clay Sherd Tempered Plain being the only other clay tempered ware known in the Middle Atlantic (Evans 1955: 75, Griffith and Artusy 1977).

Mockley Ware-

two types are defined, Mockley Cord-Marked and Mockley Net-Impressed. Tempered with crushed shell, either oyster or ribbed mussel. Interior surfaces either smoothed or scraped. Thickness ranges from 7 - 11 millimeters. Constructed by coiling with paddle-and-anvil technique to a conoidal shape with a direct rim. Lips are rounded and smooth or flattened and impressed. Distributed in all areas around the Chesapeake Bay with heaviest concentrations on the Delmarva Peninsula, in the James River area and south of Baltimore (Stephenson and Ferguson 1963, Griffith and Artusy 1977).

Hell Island Ware-

two types are defined, Hell Island Cord-Marked and Hell Island Fabric-Impressed. Interior surfaces are smooth with thickness ranging from 6 - 9 millimeters. Temper is finely crushed quartz with mica inclusions often present. Fewer coil breaks than earlier wares probably represent improved techniques of coiled and paddle malleated manufacturing. Shape is conoidal with direct rims, and flat, corded or fabric-impressed lips. Distributed in Delaware and Maryland's Eastern Shore. Related types occur from New York to Virginia. (Wright 1960, Thomas 1966, Artusy 1977)

Townsend Series Ware-

divided into two series, the earlier Townsend Incised Series including Rappahannock Fabric Impressed, Rappahannock Incised, Townsend Incised and Townsend Herringbone; and the later Townsend Corded Series including Rappahannock Fabric Impressed (occurs in both series groups), Rappahannock Incised (horizontal motif) and Townsend Corded Horizontal. The ware is crushed shell temper with decorated exteriors and smooth interiors. Thickness ranges from 5 - 10 millimeters. Construction is by coiling to a conoidal shape with direct rim and normally a rounded, smooth lip. The Incised Series distribution includes Delaware from Dover south, throughout the Delmarva Peninsula, into the Western Shore of Maryland and south to the James River in Virginia. The Corded Series distribution has a more southern distribution in Delaware where it seldom occurs above southern Sussex county. It does not occur in the lower Eastern Shore of Maryland but is rare on the Western Shore. The cord impressed designs are very similar to those found on Potomac Creek Cord-Impressed Ware to the west (Blaker 1963, Artusy 1977, Griffith 1980).

Sullivan Ware-

this is a thin-walled shell tempered ware whose distinguishing characteristic is a significantly browner paste containing smaller and fewer shell particles than Townsend Ware. It has conical bases and partially smoothed cord markings. The paste is extremely compact compared to Townsend Ware and the cord-marking is finer (Wright 1973, Peck 1979). It is associated with the Townsend Corded Series.

Potomac Creek Ware-

two types are found, Potomac Creek Plain and Potomac Creek Cord-Marked Smooth interior surface. Thin walled with crushed quartz or coarse sand temper. Characteristically very well fired and hard. Coil construction with paddle malleated shaping. Lips are rounded; flattened or wedge shaped and rims are usually flared. Generally globular shaped bodies. (Stephenson and Ferguson 1963). Two phases of Potomac Creek Ware have tentatively been identified which show certain distinguishing physical characteristics. The earliest phase Potomac Creek Ware has a clayey paste and often a thickened lip or applique strip at or below the rim. The later phase Potomac Creek Ware has a rounded or flat lip and is very similar to the "classic" Potomac Creek

Ware described by Schmitt (1965).

Mayoane Ware-

three types are recognized, Mayoane Plain Ware, Mayoane Cord Impressed and Mayoane Incised. Constructed by coiling technique with paddle malleated or smoothed surfaces. Temper is with extremely fine-grained micaceous sand often mixed with coarser sand or occasionally crushed quartz. The distinguishing characteristic of the ware is its gritty, soft, slightly friable texture. Vessels are small to medium small with globular bodies, rounded bases, and flaring, straight or slightly inverted rims (Stephenson and Ferguson 1963).

Colono-Indian Ware-

an aboriginal ceramic ware exhibiting native technology used in manufacture, but utilizing European inspired vessel forms (Noel-Hume 1962).

CHAPTER II: CHRONOLOGY

The nature of the artifacts preferentially selected by collectors, namely projectile points and ceramics, make them potentially the most useful of all materials for determining the time at which a site was occupied. I use the term "potentially" here because a very major problem currently exists in asking chronological questions of our material on the Delmarva Peninsula. This problem is the fact that no typological system based upon adequate samples from known stratigraphical contexts currently exists for the study area. This means that in order to have a typology to refer to one must borrow from pre-existing typological systems from other areas. This is shaky business at best as what occured projectile point wise in West Virginia during the Late Archaic is certainly no guarantee that the same thing was happening in central Delmarva at the same time. This problem makes any chronology which one may devise a very questionable affair and this in turn makes the formation of things such as ecological models for the various periods very questionable.

The typological categories themselves are often very unclear [this is using the term "typology" to indicate a system consisting of "types" that are made up of two or more attributes (Rouse 1960, Redman 1973:67)]. For example, the Middle Archaic Morrow Mountain I (Coe 1964), the Late Archaic Piscataway (Stephenson 1963), and the Middle Woodland Rossville

(Ritchie 1961) all have characteristics which are very similar and size ranges which overlap. The side-notched points which include such seeming look-alikes as the Brewerton, Vernon and Selby Bay Side-Notched were indivisible to Kinsey (1972). This typological muddle could be enumerated for several other point types, but the problem is already clear. The solution to this chronological problem lies in future carefully controlled systematic surveys and excavations. The value of a sequence derived from controlled demonstrable contexts is undoubted, but until this comes to pass a preliminary chronology based upon primary existing sources will serve to provide a preliminary ordering of the known data. There can be no doubt that future work in the region will modify this chronology, but for the present such a chronology can serve to at least list what material is present in the study area so that it can be compared to the Middle Atlantic region as a whole.

For the Paleoindian and Archaic periods I have relied heavily on the chronology developed by Steponaitis (1980) for the Patuxent River drainage on the Western Shore of Maryland. This study in turn was based upon a synthesis of projectile point chronologies derived from a wide area of the Middle Atlantic region. The work of Coe (1964) in North Carolina; Broyles in West Virginia (1971); the further refinement of Broyles work by Chapman (1975, 1976); Ritchie in New York (1961) and Kinsey in the Upper Delaware VAlley of Pennsylvania (1972) were all drawn upon to form a chronology for the Chesapeake region.

For the Woodland period, our chronology is somewhat more secure due to the excellent work in Delaware by Wise (1975), Artusy (1976) and Griffith (1977, 1980) on the ceramics of the Delmarva Peninsula. A bit further afield, work by Wright (1973) on the Western Shore; McNett and Gardner (1975) in the Piedmont and Coastal Plain areas; Gardner (1974) in the Shenandoah Valley and Clark (1976) in the Piedmont west of Baltimore was drawn upon for chronology development. Some changes to Steponaitis' chronology were necessary and felt to be justifiable for the Woodland period based upon the ceramic studies done in southern Delaware by Artusy (1976) and Griffith and Artusy (1977). A summary of the chronology used in this study is presented in Figures 3 and 4. As a thorough discussion of the chronology used in this study is presented in Steponaitis' (1980) report, only a brief review of the chronological periods will be presented here with particular emphasis on the later Woodland periods where changes have been instituted. For further discussion of chronology, the reader is referred to Steponaitis (1980:42-60).

The prehistory of the Eastern United States is divided into three broad cultural and chronological periods, the Paleoindian, the Archaic and the Woodland. The dates of these periods vary, but the broad based subsistence and settlement patterns appear to be very similar throughout the entire region.

PALEOINDIAN PERIOD

This period is dated from approximately 13,000 B.C. to 7500 B.C. The Paleoindian period occured during the time of the last glacial and

ARCHAIC PERIOD CHRONOLOGY AND DIAGNOSTIC POINT TYPOLOGY

PHASE		TRADITION	DIAGNOSTIC POINT
B.C./A.D.			
500			
	Marcey Creek		
1000	Late Archaic VI	Fishtail	Orient & Dry Brook
1500	Late Archaic V	Broadspear	Perkiomen, Susquehanna
	Late Archaic IV		Clagett, Savannah River, Koens-Crispin
2000	Late Archaic III		Holmes
2500			
	Late Archaic II	Piedmont/	Vernon
3000		Laurentian	Brewerton SN,CN,EN,ET
3500			
	Late Archaic I		Piscataway
4000			Otter Creek
	Middle Archaic III		Guilford Lanceolate
4500			
	Middle Archaic II		Morrow Mountain I & II
5000			
5500	Middle Archaic I		Stanly
6000	Early Archaic V		Kanawha
	Early Archaic IV	Bifurcate	Le Croy
6500	Early Archaic III		St. Albans
	Early Archaic II		Kirk CN & Stemmed
7000			
	Early Archaic I	Corner-Notched	Palmer
7500			
	Dalton - Hardaway		
8000			Dalton
	Middle Paleoindian		Hardaway
8500			Middle Paleo
9000	Clovis		Clovis
9500			

Figure 3

the beginning of the postglacial period. The environmental factors at work during this time must have had a profound influence upon the life-ways of Paleoindian groups.

About the only remaining evidence of this period is in the form of lithic tools, most especially projectile points. Gardner's work at the paleoindian Thunderbird site in the Shenandoah Valley of Virginia has resulted in a proposal that the Paleoindian period can be divided into three phases: Fluted, Corner-Notched and Side-Notched. The Corner-Notched and Side-Notched phases have normally been assigned to the succeeding Archaic period (post 7500 B.C.) but Gardner considers a similarity in lithic assemblages and manufacturing technology plus an assumed continued emphasis on hunting to justify their inclusion in the Paleoindian period. However, as Steponaitis (1980:43) points out, certain environmental changes, shifts in settlement pattern and population size and minor additions to the tool kit seem to argue for a separation of the Paleoindian period from the Corner-Notched and Side-Notched phases. The argument of a hunting based economy continuing throughout all three phases is even harder to prove, especially for an area as environmentally different from the Shenandoah Valley as the Delmarva peninsula. This is supported by evidence from the Shawnee-Minisink site (McNett et al. 1977: 284) on the Delaware River where a more broad based economy is indicated by hawthorne pits and fish bones in association with a hearth dated to 8640±300 B.C. With this in mind, for the purposes of this report the Corner-Notched and Side-Notched Phases will be assigned to the Early Archaic period.

WOODLAND PERIOD CHRONOLOGY AND CERAMIC TYPOLOGY

	LOWER EASTERN SHORE of MARYLAND		PATUXENT RIVER (WESTERN SHORE)	
1200 BC		MARCEY CREEK PHASE		MARCEY CREEK PHASE
1100	Marcey Creek Ware			
1000		DAMES QUARTER PHASE	Marcey Creek Ware	
900	Selden Island Ware			
800	Dames Quarter Ware			
700		WOLFE NECK PHASE	Accokeek Ware	
600	Wolfe Neck Ware			ACCOKEEK PHASE
500				
400	Coulbourn Ware			
300			Smallwood & Popes Creek Ware	
200				SMALLWOOD PHASE
100				
BC-AD				
100	Mockley Ware	SELBY BAY PHASE		
200			Mockley Ware	SELBY BAY PHASE
300				
400				
500		HELL ISLAND PHASE		
600	Hell Island Ware			
700				
800			Townsend Incised Series -RFI -RI complex -Townsend Herringbone	LITTLE ROUND BAY PHASE
900				
1000	Townsend Incised Series -RFI* -RI(complex) -Townsend Herringbone	LITTLE ROUND BAY PHASE		
1100				
1200				
1300	Townsend Corded Series -RFI* -RI(horizontal) -TCH *Sullivan Ware	SULLIVAN COVE PHASE; POTOMAC CREEK COMPLEX	Townsend Corded Series -RFI -RI horiz. -TCH *Sullivan Ware	SULLIVAN COVE PHASE
1400	Potomac Creek & Mayoane		Potomac Creek Ware	POTOMAC CREEK COMPLEX
1500				
1600				
1700				

Figure 4

Gardner does distinguish three sub-phases within the Paleoindian phase: the Clovis, Middle-Paleo and Dalton-Hardaway. These are recognized in this report and indeed are present in the study area.

The Clovis phase is marked by the "classic" eastern Clovis point. This point is a lanceolate biface with partial edge grinding, lateral pressure retouch and fluting scars (Gardner 1974:14). A Clovis point from the Shawnee-Minisink site was from a level where three of four radiocarbon dates 9100±1000 B.C. (W-3391), 8640±300 B.C. and 8800±600 B.C. agree well with the chronology of this report.

The second Middle-Paleo phase is distinguished by a fluted point which is "smaller, thinner and more markedly fluted" than the Clovis (Gardner 1974:15). This point occurs stratigraphically above the Clovis at the Thunderbird site and probably dates from around 9000 to 8500 B.C.

The final phase is the Dalton-Hardaway. These points are roughly triangular in outline with a deeply concave base with adjoining prominent "ears." Fluting is still present, but in reduced form. Gardner (1974) estimates a date of 8000 to 7000 B.C. for these points which fits well with other published radiocarbon dates for them from other areas of the United States.

EARLY ARCHAIC PERIOD

The Early Archaic period dates from approximately 7500 to 6000 B.C.

The period is divided into five phases of two broad traditions for the purposes of this study.

Corner-Notched Tradition:

The Early Archaic I phase is denoted by the Palmer point. This point is a small (average length=3.5 centimeters), serrated, corner-notched point with a ground base. A radiocarbon date of 7250$\pm$ 300 B.C. (W-3006) from between the Palmer and later Kirk levels at the Fifty Site in Virginia (Gardner 1974) suggests a dating prior to that time.

The Early Archaic II phase is marked by the Kirk Corner-Notched point. This point closely resembles the Palmer point, but exhibits no basal grinding and is generally about double the size (average length= 7 - 10 centimeters) of the Palmer, although a smaller variety is known (Broyles (1971). These points occur stratigraphically below a stemmed variety of the Kirk point at the St. Albans site in West Virginia, but for the purposes of this report both points will be considered a single time unit dated to approximately 7000 to 6800 B.C. although the Kirk stemmed point is considered a poor temporal marker.

Bifurcate Tradition:

This tradition succeeds the corner-notched tradition in the Early Archaic and is subdivided into three phases.

The earliest of these is the Early Archaic III phase marked by the St. Albans point. This point is a small triangular side-notched point with a bifurcated base (Broyles 1971:73-75). This phase is probably dated between 6800 and 6600 B.C.

The Early Archaic IV phase is marked by the LeCroy point. This point is small (average length=2.7 centimeters) and thin with pronounced shoulders and a bifurcated base (Broyles 1971:69). A radiocarbon date of 6300±100 B.C. at the St. Albans site in West Virginia agrees well with an assigned time range of 6600 to 6300 B.C.

The last phase of the Early Archaic, the Early Archaic V, is marked by the Kanawha point. The Kanawha is a small (average length=3.5 centimeters), triangular point with pronounced shoulders and a shallowly notched base. At the St. Albans site this phase is dated to 6210±100 B.C. (Broyles 1971). A time range of from 6300 to 6000 B.C. is assigned here.

MIDDLE ARCHAIC PERIOD

The Middle Archaic period will be assigned to the time period from 6000 to 4000 B.C. for the purposes of this study. The period is divided into three phases. The primary reference source for this period is Coe's work at the Doershuck site (1964) in North Carolina.

Middle Archaic I:

This phase is marked by the Stanly point, a broad, triangular point with a narrow stem and a shallowly notched base. Its average length is 5.5 centimeters (Coe 1964). A resemblance to the Kirk Stemmed point is noted by Coe (1964:112) and it is possible that the Stanly point represents the same tradition. In North Carolina the first evidence of groundstone artifacts appears in this phase (Coe 1964). This phase is assigned dates between 6000 and 5000 B.C.

Middle Archaic II:

The Morrow Mountain points types I and II mark this phase. The first variant, the Morrow Mountain I point, is characterized as a small (average length=4.5 centimeters triangular point with a short pointed stem while the Morrow Mountain II point has a long (average length=6.0 centimeters), narrow blade with a long tapered stem (Coe 1964:37). These are very common points in the study area. Radiocarbon dates exist for these points from a number of locations, the nearest of which is from the Icehouse Bottom site in Tennessee with a date of 5045±245 B.C. (Chapman (1976). A terminal date is indicated by the 4300±190 B.C. date from Russell Cave in Alabama (Griffin 1974). An overall time range of from 5000 to 4200 B.C. will be assigned.

Middle Archaic III:

The final phase of the Middle Archaic period is marked by the Guilford Lanceolate point. This point is long (average length=9.0 centimeters) and slender with a straight, rounded or concave base (Coe 1964). No radiocarbon dates exist for this point, but dating of a later complex indicates that the temporal range of this phase is between 4200 and 4000 B.C.

LATE ARCHAIC PERIOD

The Late Archaic period is assigned the time period from 4000 to 1000 B.C. The period will be divided into six phases. The material culture of this phase appears to increase in diversity and outside influences may be at work (Thomas 1976).

Late Archaic I:

This phase is characterized by the Piscataway point, a small (average length=5.0 centimeters), leaf-shaped projectile with a contracting stem (Stephenson and Ferguson 1963:16). The point is dated by McNett and Gardner (1975) to between 4000 and 3000 B.C. The point is associated with the Piedmont tradition (see Chapter VII) which arises to the south and west of the Delmarva peninsula. A second point, the Otter Creek Side-Notched, is also dated to this phase (Ritchie 1961:40). This point is long (average length=8.0 centimeters) with characteristically squared tangs. It is associated with the northern Laurentian tradition (see Chapter VII) but is not considered to be a good temporal marker as it has been found in Middle Archaic contexts. A third point, the Lamoka, is dated to this period by Ritchie (1961). It is a small, narrow, thick point with a poorly defined base.

Late Archaic II:

A number of different points associated with varying traditions also mark this phase. The Piedmont tradition Vernon point which is typologically similar to Coe's Halifax point (Coe 1964) is a short (average length=4.0 centimeters), thick, stubby point with pronounced shoulders. Brewerton Corner-Notched, Brewerton Eared-Notched, Brewerton Eared-Triangles and Brewerton Side-Notched points are also assigned to this phase. They are all associated with the northern Laurentian tradition, but no other Laurentian material as defined by Ritchie (1969) seems to occur on the lower Eastern Shore. Based on radiocarbon dates from surrounding areas, a time range of between 3000 to 2000 B.C. is assigned to this phase.

Late Archaic III:

The Holmes point marks this phase. This long (average length=4.5 centimeters) and narrow point is one of a number of similarly shaped converging stemmed points (McNett and Gardner 1975); Handsman and McNett 1974). The Holmes point closely resembles the Bare Island Point (Ritchie

1961) and the Lackawaxen Stemmed point (Kinsey 1972). Based on dates for these two typologically similar points, this phase is assigned a time range of between 2200 and 1900 B.C.

Late Archaic IV:

This phase marks the beginning of a tradition known as the Broadspear, which is defined by broad blade-like points and the presence of steatite vessels. The two marker points of the Late Archaic IV are the Savannah River and the Koens-Crispin. The Savannah River point is a very large (average length=10 centimeters), heavy triangular point with a broad, square stem (Coe 1964:44). The Koens-Crispin point is a variant of the Savannah River which differs in having a contracting or trapezoidal stem (Kinsey 1972:423). The Koens-Crispin resembles Ritchie's (1961) Snook Kill point. Based on radiocarbon dates from North Carolina and Pennsylvania, a date range of 1900 to 1700 B.C. is assigned.

Late Archaic V:

This phase represents a continuation of the Broadspear tradition. The phase is marked by two points, the Perkiomen and the Susquehanna Broadspears. The Perkiomen is a broad, flat, generally asymmetrical point with a narrow stem and an average length of 7.5 centimeters (Kinsey 1972). The second, and possibly later point, is the Susquehanna. This point is of variable length (anywhere from 2.5 centimeters to 20 centimeters), with angular ears, ground stem edges and prominent side notches (Kinsey 1972:427). Steatite bowls also mark this phase and have been found associated with broadspear points in Maryland at the Marcey Creek site (Manson 1948:223-227). The temporal range of the Late Archaic V phase spans from 1700 to 1500 B.C. based on radiocarbon dates from surrounding states.

Late Archaic VI:

The last phase of the Late Archaic period is associated with the Fishtail tradition and is marked by two point types: the Orient Fishtail and the Dry Brook Fishtail. These two points are very similar in having a notched base with narrow side-notches, but the Dry Brook point is marked by more angular shoulders than the otherwise similar Orient point (Kinsey 1972). Steatite bowls are again associated. The Orient point has been radiocarbon dated to 1280±120 B.C. at the Zimmerman site in Pennsylvania while the Dry Brook has a radiocarbon date of 1170±120 B.C. at Brodhead-Heller site also in Pennsylvania (Ibid 432-433). It should be noted that these two points have also been found in Early Woodland contexts by Manson (1948) and Stephenson and Ferguson (1963) where they seem to represent a continuation of the Fishtail cultural tradition.

EARLY WOODLAND PERIOD

The classic marker of the Early Woodland period in particular, and the Woodland Period in general is the appearance of ceramics. The Early Woodland period is dated on the Delmarva peninsula from approximately

1200 B.C. to 700 B.C. with two phases occuring: the Marcey Creek phase and the Dames Quarter phase.

Marcey Creek Phase:

The Marcey Creek phase is marked by the presence of Marcey Creek Ware and the Orient/Dry Brook points (Manson 1948). It can be seen that the Marcey Creek phase seems to represent a continuation of the earlier Late Archaic Fishtail tradition, but with the addition of steatite tempered ceramics. On the Delmarva peninsula a reasonable date range for this phase would be from 1200 to 900 B.C. with a radiocarbon date of 950±95 B.C. at the Monocacy site fitting these dates well (McNett and Gardner 1971). A second type of ceramics, Selden Island, also marks this phase. This ware is also steatite tempered and exhibits coiled construction unlike Marcey Creek ware and cord impressing is present. The probable temporal range of 1000 to 700 B.C. (Artusy 1976:2) shows it to arise slightly later than Marcey Creek, but to temporally overlap both it and Dames Quarter Ware.

Dames Quarter Phase:

This phase is marked by the presence of Dames Quarter ware, a distinctive and very regionalized blackstone tempered ceramic (Wise 1975). Very large amounts of this ware occur in Somerset county in particular. Its use of crushed hard stone for temper seems to hint at the later use of such tempering material in the next phase. No radiocarbon dates exist but its assignment to within the general range of 1000 to 700 B.C. in Delaware (Artusy 1976) places it clearly within the Early Woodland.

MIDDLE WOODLAND PERIOD

The Middle Woodland period is dated from 700 B.C. to 1000 A.D. for the purposes of this study. The period is divided into three phases for the study area: the Wolfe Neck Phase, the Selby Bay Phase and the Hell Island Phase.

Wolfe Neck Phase:

This phase is marked primarily by the presence of Wolfe Neck Ware (Lewis 1972) or Coulbourn Ware (Griffith and Artusy 1977). Wolfe Neck ware is especially common in the study area and in southern Delaware with lesser amounts occuring into the northern Piedmont area of Delaware. It is notably similar to such Western Shore and Piedmont types as Accokeek Ware (Stephenson and Ferguson 1963) and Popes Creek Net (ibid). Coulbourn Ware is another localized ware type with much the same spatial distribution as Wolfe Neck ware.

Radiocarbon dates for Wolfe Neck ware from the Wolfe Neck site in southern Delaware date it to 505±60 B.C. (Artusy 1976). Another date from the Dill Farm site in western Kent County, Delaware places it at 500±85 B.C. (ibid). Coulbourn ware is radiocarbon dated at the Wolfe Neck site in Delaware at 375±60 B.C. (ibid).

The Calvert point, a small (average length=3.6 centimeters), square stemmed point (Stephenson and Ferguson 1963) is similar to Kinsey's (1972) Lagoon point which has been dated by Ritchie (1969) to between 520 and 100 B.C. Assuming the two points are temporally related, this would place the Calvert within this phase. Two other point types are dated to occur within this phase: the Rossville and the Potts point. The Rossville is a thick, lozenge-shaped point of medium length (average length=5.0 centimeters) (Ritchie 1961:46). Radiocarbon dates associated with this point from New Jersey and New York (Ritchie 1969) correlate well with dates from the Potomac River region (Handsman and McNett 1974) to place this point within the range of this phase. The Potts point is a medium size (average length=4.0 centimeters), triangular shaped point with small notches at the base corners which create a short stem (McCary 1953). The sides are usually convex in outline. No radiocarbon dates exist, but the point is dated to ca. 1 A.D. in Virginia and thus is probably associated with the final stage of Wolfe Neck Phase.

A unique aspect of this time period is the influx of exotic traits which are seemingly related to the Adena culture of the Midwest. This aspect of Delmarva prehistory is known only from partially excavated burial sites, all of which but one in Anne Arundel County, occur on the Eastern Shore. This archaeological complex, known as the Delmarva Adena, has been the source of much discussion (for example Ritchie and Dragoo 1959, Dragoo 1964, Thomas 1969) since it was first discovered and all this discussion will not be repeated here. The very restricted nature of the sites which have been excavated really provide very little information about non-ceremonial aspects of Delmarva Adena culture. The non-mortuary related material culture which should be associated with this archaeological complex is somewhat open to speculation, but the material from the Nassawango Site in Worcester County, Maryland, within the study area seems to suggest an association with Rossville-like projectile points and a crushed quartz tempered ceramics which sounds very much like Wolfe Neck Ware. Radiocarbon dates from Nassawango of 240±70 B.C., 495±100 B.C., and 305±100 B.C. seem to further tie the Delmarva Adena Complex to Wolfe Neck Phase. Additional radiocarbon dates from the Wolfe Neck Site of 375±65 B.C. and 505±60 B.C.; the St. Jones Site of 380±80 B.C. and the Dill Farm Site of 380±85 B.C. and 500±85 B.C. (all in Delaware) also correlate well (Thomas 1977a). The better known ceremonial goods such as large blades of exotic stone, side or corner-notched blades with convex bases and sides, Ohio fireclay blocked-end pipes, copper, hematite, slate gorgets and shell ornaments are suggested by Thomas (1969) to be the result of a trade network rather than an actual expansion of Ohio Valley groups into the Delmarva peninsula.

In sum, the Wolfe Neck Phase can be said to date from about 700 B.C. to A.D. 110 when the later Selby Bay phase begins. The placing of this phase within the Middle Woodland Period is largely based upon change in ceramic technology and style as defined by Artusy (1976) in southern Delaware. Kinsey (1974) sees little change at all between the Early and Middle Woodland Periods, he speaks of a "cultural continuum," and unfortunately the lithic material is of little help here as it could easily be confused with Late Archaic material.

Selby Bay Phase:

The term Selby Bay Phase is used here in the sense of the classic definition of the phase (Mayr 1972; Wright 1973). The reasons for this use will be detailed later, but it is acknowledged that later excavation within the study area could very well alter the definition of this time period. The phase has traditionally been defined by the presence of Mockley Cord-Marked, Mockley Net-Impressed and Mockley Plain ceramics and Selby Bay points or knives (Stephenson and Ferguson 1963:103-109, Wright 1973). The presence of imported lithic material such as rhyolite, purple argillite and green, yellow or brown jasper; elliptical two-holed gorgets, and three-quarter grooved axes are also supposed to mark this period (Wright 1973:21, Mayr 1972).

Problems with the application of this definition to the Delmarva peninsula have been pointed out by Thomas et al. (1974) when they stated there seemed to be no association between Mockley ceramics and Selby Bay projectile points on the Delmarva peninsula. They instead defined a "Carey Phase" where Mockley ceramics were associated with side-notched projectile points similar to those which they felt were associated with the Delmarva-Adena complex. Further confusion arises though when other instances are discussed where Mockley ceramics do occur with Selby Bay points in Delaware (Thomas 1974). A period known as the "Oxford Complex" is defined in Delaware as following the "Carey Phase" (Thomas et al. 1974). This complex includes Selby Bay stemmed and lanceolate points, "expanding stemmed points" which "grade into Fox Creek (Selby Bay) stemmed" and pentagonal points which "appear to be similar to Fox Creek (Selby Bay) stemmed variety" (Thomas et al. 1974). This is a very confusing description at best and the lithic assemblage of the "Oxford Complex" is really not distinguishable from it. The "Oxford Complex" is also said to be associated with what is presumably Hell Island ware.

In order to test some of the statements given above, counts were done on the material which was seen for this study so that it could be seen which point types were most associated with Mockley Ware. It is admitted that the data generated by this study suffers from many theoretical and practical shortcomings, such as the effects of collector bias, but it was felt that some associations may be revealed that would aid in defining the mid-Middle Woodland, at least for the study area. These counts showed that for almost 30% of the sites examined for this study Mockley Ware was associated with Selby Bay points. This was the highest percentage of association with Mockley Ware for any point type. The association of Hell Island Ware and Selby Bay points as defined for the "Oxford Complex" of Delaware did not occur at any of the sites within the study area (association=0%). The next highest percentage of association between Mockley Ware and a point type was for its association with Perkiomen points. Mockley Ware and Perkiomen points were associated at 23.5% of the sites, but if the number of sites where Mockley Ware is associated with Perkoment points <u>and</u> Selby Bay points jointly are subtracted from the 23.5% Mockley-Perkiomen site association figure, then only 11.7% of the sites show an association without the joint presence of Selby Bay points. These figures would seem to argue for applying the more traditional definition of the Selby Bay Phase where an association of Mockley Ware and Selby Bay points is one of the defining characteristics to the study area. The further criterion of the presence of exotic raw materials is not so easily tested as sites with Selby Bay components defined by either diagnostic lithics or ceramics may also have non-diagnostic lithic material present (such as drills, scrapers, etc.) or they may have no lithic material present at all. However, when a count is done of all Selby Bay Phase sites with lithics present (N=23) and compared to the presence or absence of diagnostic exotic lithic materials, then some indications are further given that the classic definition of the Selby Bay Phase may be applicable within the study area. Rhyolite is present at 48% of the sites; argillite is present at 56.5% of the sites and at least one of the characteristic jaspers is present at 60.8% of the sites. These figures must not be depended on too heavily as most of the twenty three sites are multi-component in nature, but they conversely do not contradict the application of the classic definition of the Selby Bay Phase.

Based upon this data, this study will utilize the classic definition of the Selby Bay Phase (Mayr 1972). It will be considered to date from A.D. 110 to A.D. 485 based upon Artusy's (1976) dating of Mockley Ware. These dates coincide closely with the dates given in Delaware for the "Carey Phase" (A.D. 100 to A.D. 400). Radiocarbon dates associated with this phase include from A.D. 200±90 from the Carey Farm site in Delaware (Wise 1974) to A.D. 815±95 at the Loyola Retreat site in Maryland (Handsman and McNett 1974). It should be noted that the latest date would seemingly not apply in the study area as another phase intrudes on this later period with the study area. This phase will be discussed next.

Hell Island Phase:

This phase is defined based upon a change in ceramic and point type traditions from the preceeding Selby Bay Phase. The markers of the Hell Island Phase are Hell Island Cord-Marked and Hell Island Fabric-Impressed Ceramics (Wright 1960:14-15) and Jacks Reef Pentagonal and Corner-Notched points (Ritchie 1961:26-28), as well as Levanna Triangular (Ritchie 1961:30) points if these are directly associated with Hell Island Ware. For the purposes of this study, Levanna Triangular points were seldom used to denote the Hell Island phase as it was impossible to tell if they were associated with later Late Woodland components on the majority of sites which were multi-component and included both Middle Woodland and Late Woodland material.

The Hell Island Phase seems to relate to the ill-defined "Oxford Complex"(Thomas et al. 1974) and the ceremonial center defined "Webb Phase" (Thomas and Warren 1975). Thomas et al. (1974) discuss "pentagonal points" in relation to the Oxford Complex but they describe these pentagonal points as similar to the Selby Bay Lanceolate Variety. (?) It would seem that they could also be considered similar to the Jacks

Reef points as well. The ceramics of the Oxford Complex are described as "quartz-tempered ware resembling Albermarle pottery" (ibid). From this description one must assume that these ceramics are the same as Artusy's Hell Island Ware (1976). This same type of ceramics was excavated at the Island Field site in Delaware (Thomas and Warren 1970) in association with the "Webb Phase" which is defined by the exotic items associated with burials at the site. These exotic items seem to represent a return of influence from the Ohio Valley region, most likely through a trading network.

Hell Island Ware has a somewhat more northern center of distribution than Mockley Ware in Delaware and it has been suggested that the presence of Hell Island Ware could be the result of either an intrusion from the north or influence eminating from that direction. Similar ceramic types occur as far north as New York (Ritchie 1949:110), but no further south than Virginia (Evans 1955:41-43). The Selby Bay Phase and the Hell Island Phase may be partly contemporaneous.

Two radiocarbon dates exist for Hell Island Ware, one of A.D. 645±55 and another of A.D. 740±90, both from Delaware.

Thus, for this study, the Hell Island phase will be assigned to the period A.D. 500 - 900.

LATE WOODLAND PERIOD

The Late Woodland Period dates from A.D. 1000 until the contact period at approximately A.D. 1600. The period will be divided into two phases: the Little Round Bay Phase and the Sullivan Cove Phase with a cultural complex, the Potomac Creek Complex, falling within the last phase.

The original division of the Late Woodland Period into two phases was suggested by Wright (1973) based upon his work in the Severn Drainage area of the Western Shore. Wright's ordering of the phases was not based upon stratigraphic evidence, but rather upon a study of decorative attributes and surface treatments of ceramics with data from the Potomac Valley and southern Delaware. Wright's initial chronological sequence was later shown to be reversed and over-simplified (Griffith 1980; Clark 1976). Griffith's (1980) work in Delaware has shown the proper sequence to be Little Round Bay Phase (A.D. 1000 to 1300) associated with incised Townsend Ware ceramics first, followed by Sullivan Cove Phase (A.D. 1300 to Contact) associated with corded design Townsend Ware and isolated Potomac Creek Ware. It must be noted that Griffith did not use these same names for the phases butthe precedent set by Wright (1973), Clark (1976) and Steponaitis (1980) in using the terms will be continued here. The phases defined for this study seem to relate to the Slaughter Creek Phase (Thomas 1974:17) defined for Delaware. Another complex, the Milford Neck Complex (Wise 1971) defined for Delaware is said to be similar to the Townsend Ware associated sites in all ways except it lacks shell-tempered ceramics and has crushed quartz temper ceramics instead. It is likely that this crushed quartz tempered ware is the same as Hell Island Ware and for the purposes of this report no distinction could be drawn.

Little Round Bay Phase:

The ceramics which mark this phase have been extensively studied by Griffith (1980) and it is upon his definitions that the Little Round Bay phase is defined. These ceramics are relatively thin-walled, shell-tempered and can be identified by complex incised motifs, Blaker (1963: 17-18) defined a Rappahannock Incised group with incising directly below the vessel lip; and a Townsend Incised group with incising a short distance below the lip. Griffith, however, shows no temporal significance can be attached to these variations and furthermore, Griffith states that both of Blaker's groups can include complex incised designs or more simple incised horizontal bands, sometimes over short vertical lines. Griffith identifies the simple horizontal motif as the more recent in time (Griffith 1980:32). Following Steponaitis' precedent (1980:56) I will adopt the convention of using suffixes to subdivide the group into Rappahannock Incised (complex motif) and Rappahannock Incised (horizontal motif). The complex motif group is associated with the Little Round Bay Phase along with Rappahannock Fabric-Impressed ceramics (Blaker 1963:16-17) and Townsend Herringbone ceramics (ibid) with cord-impressed bands over incised zig-zags.

The diagnostic projectile point type associated with the Little Round Bay phase is the triangular Levanna point (Kinsey 1972). This point is associated with Townsend series ceramics at the Mispillion site in Delaware (Thomas and Warren 1970). Problems do arise in the temporal ordering of triangular points. Ritchie claims a temporal sequence in New York running from large, equilateral points in the earliest stages of the Late Woodland to smaller isosceles-shaped points in the later period (Ritchie 1969:277-278). Again, there is a problem in applying this to the lower Eastern Shore of Maryland until these points are excavated in good stratigraphic context, but for now the distinction will be maintained. Note also that the Levanna seems to make its earliest appearance in the Middle Woodland Hell Island Phase where it is associated with Jacks Reef points. Ritchie (1969) claims that the Levanna "achieved ascendancy" over the Jacks Reef point at the close of the Middle Woodland.

Overall, the Little Round Bay Phase will be assigned to the temporal range of A.D. 1000 to A.D. 1300.

Sullivan Cove Phase:

The Sullivan Cove Phase is primarily marked by the presence of Rappahannock Incised (horizontal motif) ceramics and Townsend Corded Horizontal ceramics (Blaker 1963: 18-19). These ceramic types best typify the seeming "wholesale acceptance of the decorative techniques of the Potomac Creek complex" (Griffith 1980:36) to the west. These decorative techniques were based upon cord and pseudo-cord marking rather than incised markings. Griffith states that this change in decorative technique is due to the influence of the Potomac Creek Complex to the west and northwest of the study area. Also, pseudo-cord marking (cord-wrapped dowel) is said to pre-date direct cord impressions.

Sullivan Ware is also assigned to this phase. This ceramic is thin-walled and lightly shell tempered with a distinguishing browner paste than Townsend ceramics and with fewer shell particles (Wright 1973:22-23). Corded and incised decorations are present and are reminiscent of Townsend Ware decoration (Peck 1979). A radiocarbon date of A.D. 1385±55 from Waveland Farm in Maryland (Peck 1979) places Sullivan ware in association with Rappahannock Incised (horizontal motif) and Townsend Corded Horizontal.

The presence of Rappahannock Fabric-Impressed ceramics in this phase as well as the earlier Little Round Bay Phase makes this ceramic type a poor temporal marker. It has been found in dated contexts ranging from A.D. 1045 to A.D. 1360 (Griffith 1980:30).

The diagnostic projectile point type associated with this phase is most probably the Madison point. This is a small to medium length (average length=3.2 centimeters) point, usually isoceles in shape (Ritchie 1961:33-34). The temporal placement of this point suffers from the same problems mentioned for the Levanna point, but dating by Ritchie (1961) to A.D. 1400 to A.D. 1700 and its similarity to Coe's Uwharrie point dated to ca. A.D. 1400 (Coe 1964) seems to place it within this phase.

Thus, the Sullivan Cove Phase will be assigned a temporal range of from A.D. 1300 to Contact.

Potomac Creek Phase:

The rare occurence of Potomac Creek Cord-Impressed Ware in the central Delmarva peninsula appears to be related to the acceptance of corded decorative techniques into the Townsend repertoire. Griffith further sees a zone across central Delaware which represents a "buffer" between Potomac Creek cultural groups to the north and Townsend cultural groups to the south. Occurences of Potomac Creek ceramics within the study area probably represent trading between the two cultural groups.

Mayoane Ware is also associated with the Potomac Creek Phase although its exact temporal placement is uncertain (Stephenson and Ferguson 1963: 115 - 125).

The diagnostic projectile point of this phase is most probably the small, thin triangular Potomac point (Stephenson and Ferguson 1963).

POST-CONTACT PERIOD

The expansion of Europeans into the Delmarva peninsula by at least 1650 quickly brought about a total disruption of existing aboriginal groups. In 1642 both the Wicomico and Nanticoke groups of the Eastern Shore were declared enemies of the Europeans and this combined with pressure from the Susquehannocks finally resulted in deportation of these groups to Barbados in 1669 (Feast 1978). By 1743 the last treaty between the Europeans and remaining native groups was concluded and shortly thereafter the last of the remaining native groups of the Eastern Shore voluntarily removed themselves from Maryland to Pennsylvania.

A ware thought to represent post-contact changes to Potomac Creek ware, Camden Ware, has been identified by MacCord (1969:12-18) with the Indian Point Phase of the Potomac Creek Complex. Noel-Hume (1962) identifies a ware associated with the post-contact Townsend complex, Colono-Indian Ware, which reflects historic period changes induced on these cultural groups.

Further discussion of the Post-Contact Period will follow in a later report by Dr. Thomas E. Davidson.

CHAPTER IV: MODERN MACRO-ENVIRONMENT

The environment that exists today on Maryland's lower Eastern Shore is the result of multiple factors all of which interact to produce the setting in which man's activities take place. These environmental factors include such things as the presence of large bodies of water, geology and topography, soils, climate, flora and fauna. All of these are dynamic factors which can vary from year to year or even day to day and it is certain that dramatic changes have taken place during the span of time in which man is known to have existed on the Delmarva peninsula.

The study area of this report includes the Maryland counties of Wicomico, Worcester and Somerset. These counties lie in the south-central region of the Delmarva peninsula, bounded on the west by the Chesapeake Bay and on the east by the Atlantic Ocean. The total land area of the counties, including Smith, Deal, James, South Marsh and other Bay islands is approximately 1195 square miles. The entire area lies within the Coastal Plain Province.

RIVERS AND COAST

Surface waters on the Delmarva peninsula drain either west to the Chesapeake Bay or east to the Atlantic Ocean. Almost all surface water is contained in rivers as there are no large, natural lakes. Large areas of swamps and marsh do exist, but the majority of these contain brackish water.

The major rivers which form the drainage system of the study area include the Nanticoke, Wicomico, Manokin, Big Annemessex, Pocomoke and St. Martin rivers (Figure 2). In addition, numerous coastal creeks such as Marumsco Creek and Little Monie Creek also drain some areas. All of the streams and rivers of the drainage system can be characterized as "fairly established" (Hall 1970) with typically meandering, sluggish courses which are generally tidal in their lower reaches. The Pocomoke river is tidal throughout the entirety of its run through Somerset County and into Worcester County (Mathews and Hall 1966). The coastal creeks are also tidal thoughout most of their lengths. The effect of this tidal inundation is the formation of extensive estuarine habitats or zones where saline ocean and bay water mix with fresh water runoff being carried by the drainage systems. This salinity gradient can vary from a high in the saline zone of 0.9 to 1.6% salt content, through a brackish zone of 0.7 to 0.8% salt content, to an interface zone of 0.6% salt content until tidal effects are no longer of any influence and the water is fresh. The extent and placement of these zones for each drainage system will be influenced by factors such as stream width and depth, course followed, amount of rainfall and time of year. The extent of brackishwater is shown for the Pocomoke, Wicomico and Nanticoke rivers in Figure 5.

The Atlantic Ocean coastal region presents a different set of hydrological factors as no major river system serves to drain this area.

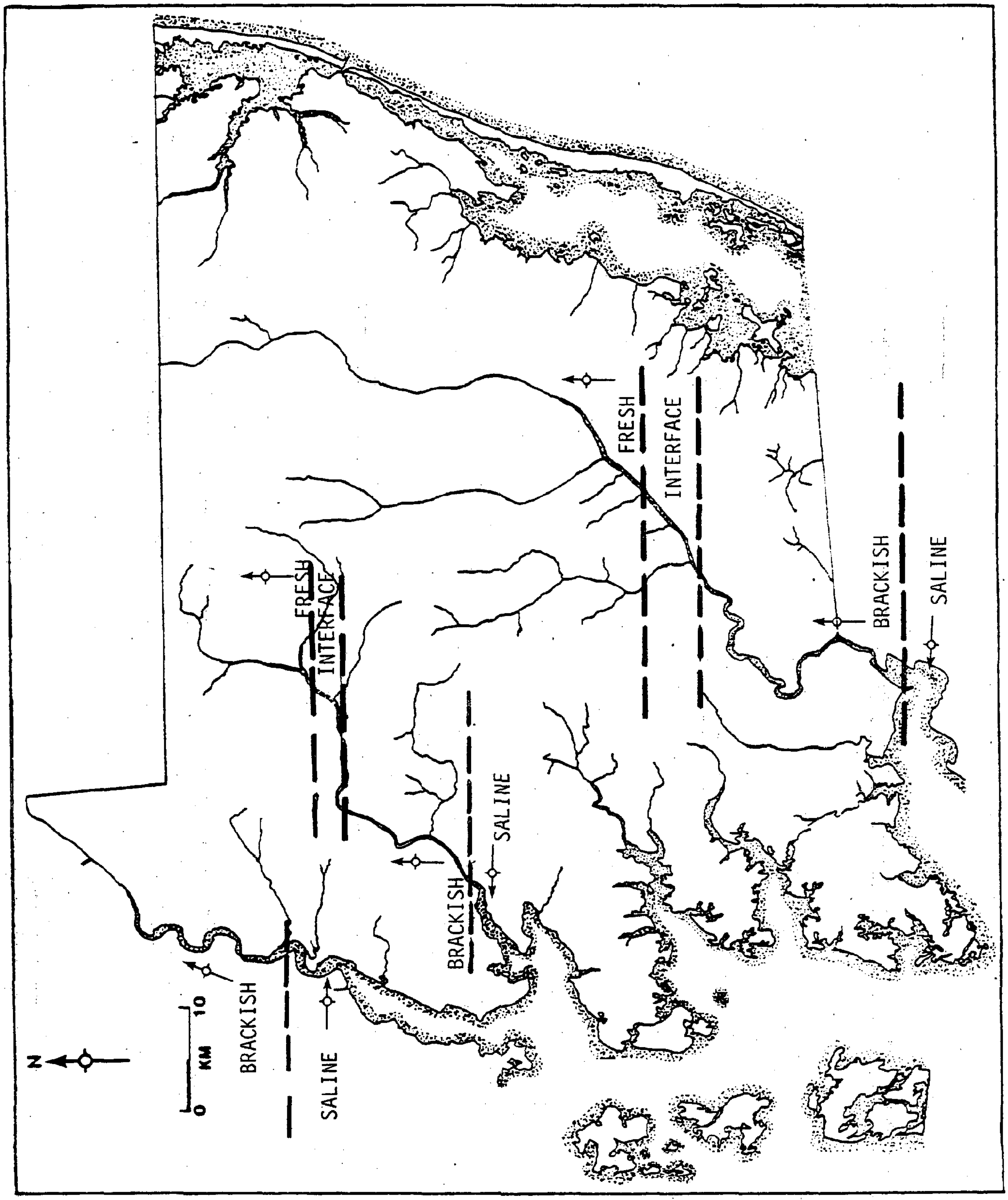


Figure 5 : DISTRIBUTION OF SALINE TO FRESH WATER ZONES ON THE POCOMOKE, WICOMICO AND NANTICOKE RIVERS.

Instead, the large coastal lagoon areas of the Chincoteague, Sinepuxent and Assawoman Bays serve as the drainage area of numerous coastal streams, the largest of which is the St. Martin's River. These coastal streams are short, sluggish and tidal in nature wih brackish water occurring in almost their entire length. Extensive areas of tidal marsh also occur along the coastal zone.

GEOLOGY AND TOPOGRAPHY

The lower Eastern Shore of Maryland is part of the Atlantic Coastal Plain which runs from Long Island, New York southward to the Gulf of Mexico. Movements of the earth's crust along the Atlantic continental margin have produced a seaward slope on the crystalline-rock basement surface. Areas to the northwest of the Piedmont-Coastal Zone interface area were uplifted and underwent erosion. Areas southeast of this interface were depressed and became regions of deposition (Cushing et al. 1973). Sediments which were eroded from the northwestern areas were shifted and deposited in the coastal plain region. These deposits are a series of wedge-shaped sheets of unconsolidated sediments largely made up of clay, sand, silt, gravel and occasionally shell deposits. These deposits range in thickness from zero at the Fall Line interface to over 8500 below Ocean City (Hall 1973). Surface deposits which date from pre-Wisconsin to Holocene are made up of undifferentiated grey to buff sand and gravel, grey to brown silt and clay, occasional boulders and rarely shells. Surficial deposits of fluvial sands and marsh muds occur along the Nanticoke and Wicomico rivers. Well sorted and stabilized dune sands occur in eastern Wicomico County. Shell bearing estuarine clays and silts are along the Pocomoke River. Recent beach zone sands are found to make up the Assateague Islands (Cleaves et al. 1968). Subsurface deposits of pre-Wisconsin buff to reddish-brown sand and gravel are locally incised into Miocene sediments in the Salisbury area. Estuarine to marine white to grey sands and grey to blue clays of pre-Wisconsin age occur in Worcester County. Underlying sediments include the Calvert Formation of Miocene age; the Nanjemoy Formation of Paleocene-Eocene age; the Matawan and Magothy Formations, and the Potomac Group of Cretaceous age; and undifferentiated Mesozoic age rocks overlying a basement of undifferentiated crystalline rocks (Cleaves et al. 1968.)

The topography of the lower Eastern Shore is typical of the Atlantic Coastal Plain in general with mostly low, eroded terrain, where elevation differences are not dramatic. In spite of this initial appearance, features such as terraces, stream channels, drowned valleys, Carolina bays, remnant sand dunes, swamps and marshes do exist (Hall 1973). These topographic features are made up of recent Pleistocene age deposits of either the Talbot or Wicomico Formations. The Talbot Formation is the younger of the two formations and borders the Chesapeake Bay and Atlantic Ocean. The upland areas of the Talbot Formation rise from tide level so gradually that large areas of marshland sometimes form. In Somerset County, west of Princess Anne, the outer edge of the peninsula has a slope of 1.75 feet to the mile, while an upland swamp on the divide between the Pocomoke and Manokin rivers is drained by a stream with a fall of three feet to the mile. In the Atlantic Coastal area of

Worcester County, slopes of 25 feet to the mile occur. Where streams cross the Talbot Formation bluffs or steep banks occur with heights of up to 15 feet. The surfaces upland of these banks are generally level. The greatest elevations of the Talbot Formation is where it meets the Wicomico Formation--here heights are between 25 and 35 feet (Shreve 1910).

The Wicomico Formation only occurs inland, extending from northern Worcester County through much of central and eastern Wicomico County. The formation is now so eroded as to be completely drained by the streams which traverse it leaving no swampy areas (ibid).

Wicomico County exhibits a variety of physiographic areas. Tidal marshes near sea level occur along the Nanticoke and Wicomico rivers. The eastern and much of the central and southwestern areas of the county are largely level to gently rolling, but swales and ridges are present in some areas. Some of these swales contain areas of poor drainage, known as Carolina Bays, which may have been attractive areas for early man as game would come here for water. Much of the county lies only a few feet above water level and marshes again arise. The highest part of the county is in the Northwest and central areas. Sand dunes occur all over the county at elevations of 10 to 85 feet (Hall 1970). These dunes will be discussed later as they seem to have been very attractive to early man.

Worcester County shows three major physiographic regions: the Coastal beaches, the Tidal marshes and the mainland (Hall 1973). The coastal beaches are mainly barrier islands ranging from a few hundred feet to a mile in width. They run the entire length of the eastern county. The tidal marshes lie mainly along the mainland, with some occuring in the southern and western parts of the county and on the bay side of the coastal beaches. The mainland is similar to Wicomico County with level to gently rolling areas which grade into marshland in some places. Carolina Bays are again present in swales containing basins. The highest point in the county is 57 feet above sea level. Dunes again occur over much of the county made up of Parsonsburg sands (ibid).

Somerset County is level to gently sloping with slopes under 2 percent, but some as high as 15 percent. The steepest slopes occur along the Wicomico and Manokin Rivers in the form of bluff-like escarpments. Most of the slope is toward the West, but part of the county slopes to the south. The highest point in the county is 46 feet above sea level in the northeastern part of the county (Mathews and Hall 1966).

CLIMATE

The climate of the lower Eastern Shore is a humid continental climate which is modified by proximity to large bodies of water (Hall 1973). The Atlantic Ocean and Chesapeake Bay affect the air masses moving over them so that in the winter cold air masses are warmed with resulting heavy precipitation while in the summer the winds are cooled by the water so that temperatures near the coast especially are lowered. The lack of terrain relief produces no variation in climate.

The average annual temperature in inland regions is 56.7 degrees while in coastal areas temperatures are similar but the average maximum temperature is three degrees lower and the average minimum temperature is 3.5 degrees higher.

The growing season usually is about 183 days long, lasting from the last week of April until the last week of October.

The annual precipitation averages around 45 inches per year with the times of heaviest precipitation most likely in the warmer part of the year. Drought can occur at any time of year, but is most likely during the summer months.

Winds can be quite strong and sand blowing can damage plant growth at its early stages (Hall 1970, 1973; Mathews and Hall 1966).

SOILS

The soils of the study area fall into two very gross categories: soils with evident soil horizons and soils with little or no horizon differentiation. The latter of these two categories results from the presence of young, recently (in terms of geological time) deposited alluvial soils and from soils which are chiefly composed of sand. The soils which show horizons are formed by one or more processes. These processes include accumulation of organic matter, leaching of carbonates and salts, chemical weathering of parent materials into silicate clay minerals, translocation of silicate clay minerals and probably silt from one horizon to another, and chemical changes such as oxidation reduction, hydration and the transfer of iron (Hall 1973).

These soil formation processes result in the formation of distinctive soil types which can be categorized according to their properties. The Soil Conservation Service of the U.S. Department of Agriculture has applied a classification system consisting of ten broad categories to the soils of the study area, of these ten categories, four occur within the study area. These four soil groups are the Entisols, Inceptisols, Spodosols and the Ultisols (Mathews and Hall 1966). The Entisols are soils which have changed little from their original parent material. Within the study area, the Entisols are of a sandy type which range from moderately wet to quite dry due to their drainage characteristics. The sand ridges or dunes which occur throughout the study area fall within this group and are excessively well drained. The Inceptisols are soils in which soil horizons have started to form. Within the study area these soils are wet most of the time due to poor drainage. The Spodosols are soils that have horizons in which organic colloids and/or iron and aluminum compounds have accumulated; or they have thin horizons cemented by iron overlying a very poor drainage layer. These soils are very poorly to poorly drained in nature. The Ultisols are soils which are very well developed. These are the most common soils within the study area. They range from well drained to very poorly drained in nature.

For a more detailed discussion of soils on the lower Eastern Shore of Maryland, the reader is referred to the soil surveys which have been performed by the U.S.D.A. Soil Conservation Service for each county: Wicomico County (Hall 1970), Worcester County (Hall 1973), and Somerset

County (Mathews and Hall 1966).

VEGETATION

When European settlers first began extensive exploitation of the study area by 1650, a dense forest of mainly hardwoods existed (Mathews and Hall 1966). Oaks dominated in most places with yellow-poplar, sweetgum, blackgum, holly, hickory, maple, dogwood and the pines: loblolly, Pond pine and Virginia pine also being present. There were probably few pure stands of pine as one sees today present before the land was extensively cleared and regrowth occurred. The modern presence of pines as the dominant tree type results from the fact that hardwood trees use large amounts of calcium and other bases for growth. These bases are returned to the soil when leaves drop and decompose, so a self-sustaining cycle can occur. However, the soils of the study area are acidic in nature and when the cover of hardwoods is removed no bases reenter the soil at all. The result is that acid tolerant species such as pines recolonize the cleared areas and since pine needles restore soil fertility very little when decomposed, the hardwoods have a hard time in reentering the area.

The modern forest cover varies according to whether it occurs on upland or lowland and what the soil drainage characteristics are. Upland forests of drained or sloping areas contain Loblolly pine predominantly with Virginia pine or deciduous trees sometimes mixed in. On poorly drained uplands sweetgum, willow oak, pine oak, and sour gum are mixed with the dominant white oaks. Upland swamp forest varies according to whether the soils are sandy or clayey. Swamps on sandy soils are prevailingly coniferous or broad-leaved if older. On clayey swamp lands deciduous species dominate with scrub pine absent. Pine though has greatly increased in the uplands due to clearing (Braun 1950).

Lowland forest makeup is also based upon the amount of water present. Two principal types occur: hardwood and cypress swamp forests. The lowland hardwood forests contain a mixture of Loblolly pine and sometimes southern white cedar. Sweetgum is abundant with red maple, willow oak, pin oak and sourgum associated. In well drained areas tuliptree and beech also occur. The cypress swamp or river swamp (Shreve 1910) occur on lands just upstream from the limit of brackish water in the tidal streams. The Pocomoke River Swamp appears to be a northern part of the Dismal Swamp to the south in Virginia and North Carolina. Bald cypress dominates with swamp black gum and red maple present. White cedar occurs near upland swamp borders with a transition to water oak, willow oak, cow oak, white oak, tuliptree, river birch and beech in the upland forests (Braun 1950).

The understory growth or ground cover of the study area varies from dense in the poorly drained swamp areas to the less dense areas of well drained woodland. Overall, the flora of the study area forms a complex mosaic based upon multiple factors forming diverse micro-environmental zones. These micro-environmental zones will be discussed in greater detail in the next chapter.

FAUNA

The animal life of the lower Eastern Shore is known to have been abundant at the time of European contact. Captain John Smith in his The General History of Virginia, New England and the Summer Isles, Volume I refers to an abundance of animals such as deers, squirrels, badger, flying squirrels, oppossum, hares, bears, beaver, otters, foxes, martins, polecats, dogs, weasels, minks and dozens of species of birds and fish (Smith ca. 1606) when he details his voyage to Virginia which included what is now the lower Eastern Shore of Maryland.

Three main groupings of terrestrial wildlife are today present within the study area. The first of these is open-land wildlife which includes rabbits, some deer, quail and other upland birds. The amount of open-land would have been much less prior to extensive land clearance by European settlers. The second grouping is woodland wildlife which includes deer, squirrel, wild turkey and many other animals and birds. This habitat grouping would have been the most common during prehistoric times. The third group is wetland wildlife including raccoons, muskrat, rails, ducks, geese and an extensive array of other waterfowl (Mathews and Hall 1966).

The fauna within the study area again responds to the diverse microenvironments which exist within these three counties of the Eastern Shore. A wide diversity of wildlife was, and still is, available for exploitation during all times of the year. An abundance of fish and shellfish, for which the area is famous, also provided vast exploitable stores of food resources.

All of these will be discussed in greater depth in the following chapter.

CHAPTER V: MODERN MICRO-ENVIRONMENTS:

This chapter will attempt to outline some of the resources which are presently available in the many and diverse micro-environmental habitats of the lower Eastern Shore. This will be done in order to gain some idea about what food and raw material resources were available to early historic and post-8000 B.P. prehistoric populations. To apply data from modern micro-environments back to pre-8000 B.P. is a difficult task. Factors of climatic change and sea level rise have caused many environmental changes. Some factors would possibly apply to earlier times in areas inland from any sea level use effects and in the coastal areas some extrapolation may be possible by projecting coastline areas back in time as has been done elsewhere (Kraft 1971, 1977). The fact that micro-environmental zones are closely related to river drainage systems could also be used in trying to infer backwards to earlier periods.

Based largely upon the work of Thomas et al. (1975) in Delaware, a six category division of micro-environments was constructed for the study area. These micro-environmental divisions are based upon soils, drainage characteristics, vegetation and predicted fauna. The categories are: 1. Poorly drained woodland and swamp, 2. Well drained woodlands 3. Transitional areas 4. Tidal marsh and estuarine environments 5. Salt water bays and oceans, and 6. Permanent Freshwater. See Figures 6 and 7 for a summary of the major environmental zones of the study

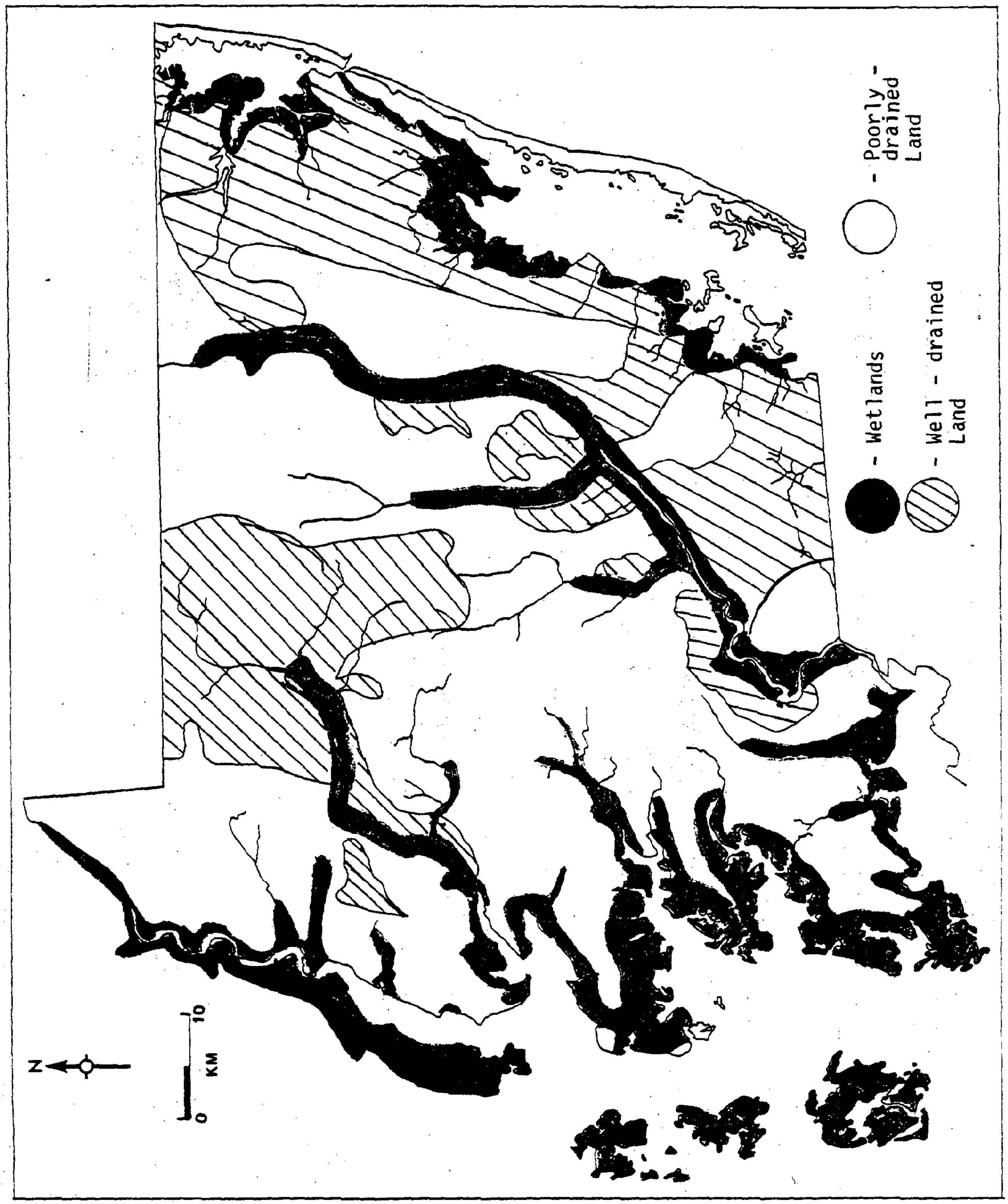


Figure 6 : AREAS OF GOOD OR POOR DRAINAGE

area.

These categories will be described here in order to provide an outline of some of the available food and non-food resources which are found within the study area. However, it must be emphasized that this treatment in no way claims to provide a complete listing of all available resources, nor does it seek to say which of these resources were actually used by human groups in the area. Human culture and behavior is too complex to be fitted into neat and totally logical patterns of "maximum exploitation of the most efficient resources." Human beings reflect cultural prejudices; for example, there may be a tremendous supply of highly nutritious edible, and easily secured grubs available to eat, but we as 20th century Americans don't eat them. We must be careful in making subsistence statements until more is known of the resources being exploited by past human groups. This can be accomplished through such means as careful excavation, flotation sampling and associated environmental and subsistence base reconstruction. Until such time we can really say very little about what the subsistence and settlement patterns of these people were. Thomas et al. (1975) took the first steps in this direction; in the future we need to follow their example on the lower Eastern Shore.

POORLY DRAINED WOODLAND AND SWAMP

These areas show poor to extremely poor drainage as defined by the U.S.D.A. Soil Conservation Service (Hall 1970, 1973; Mathews and Hall 1966). Before steps were taken to drain many of these areas, water would have been standing either on or just below the surface throughout the

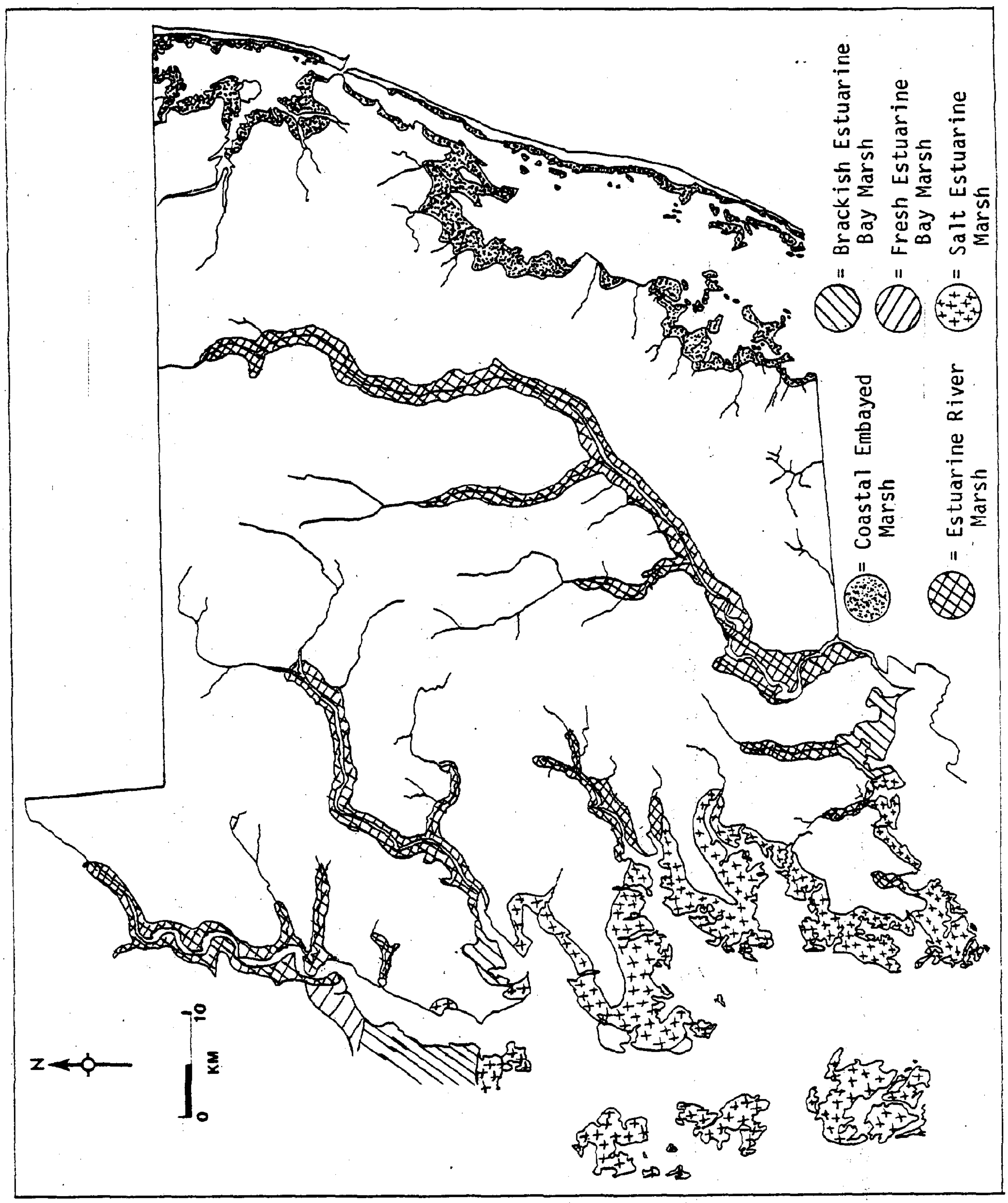


Figure 7 : DISTRIBUTION OF WETLAND TYPES

year. The U.S.D.A. soil types within this unit include: Bayboro, Elkton Series, Leon Series, Mixed Alluvial Sand, Fallsington Series, Johnston, Othello, Plummer, Pocomoke Series, Swamps, Muck, Rutledge, St. Johns, and Portsmouth.

Vegetation would consist of water-tolerant species. All vegetation within the study area is influenced by the fact that two distinct soils are present. These are the heavy Elkton clay soils and the sandy or sandy loam soils (Shreve 1910). The texture and drainage characteristics of these soils influence the type of vegetation which will be found.

In the poorly drained clay soil areas tree species include loblolly pine and deciduous trees such as sweet gum, white oak, sour gum, willow oak, red maple and swamp oak. Holly and cow oak occasionally occur. Shrubs are richer here than in any other forest habitat on the Eastern Shore. They include azalea, sweet pepperbush, high blueberry, fetter bush, black haw, magnolia (virginiana), winterberry, dogwood, and alder. The dense shade from trees and shrubs makes the forest floor in these areas very poor in herbaceous growth. The only common species are the sedges. Scattered beds of peat moss occur.

In swampy areas with sandy loam soils, two basic swamp types exist: the deciduous swamp and the pine swamp (Shreve 1910). These two are basically alike but proportions of species vary. Loblolly dominates the pine swamps while 10 to 40 percent of the remaining trees are deciduous species such as willow oak, white oak, sweet gum, red maple, water oak, cow oak, black gum, magnolia, holly and dogwood. In the deciduous swamp the latter group of trees represents 50 to 80 pereent of the stand. The floors of deciduous swamp areas have a dense stand of shrubs. Among these are wax myrtle, poison sumac, and strawberry tree. In the pine swamps shrub stands are much more open. The herbacious vegetation is almost as poor in deciduous swamps as for clay soil swamps. A carpet of peat moss is normally present. The pine swamps have a much more diverse stand of herbacous plants with at least twenty-four species present (Shreve 1910). These sandy loam swamps occur exclusively in Wicomico and Worcester counties.

River swamps are characterized by stands of Bald Cypress. These swamps occur along the Pocomoke River, Dividing Creek, Nassawango Creek, in a few upland swampy areas and along the Wicomico River. The cypress is associated with black and sweet gum, red maple, tupelo, green ash, magnolia, hornbeans, swamp poplar, water oak, white cedar, holly, loblolly pine and white oak. Undergrowth is thick and rich in species. Herbacious vegetation is very poor.

The general nature of poorly drained and swampy areas provides abundant cover and browse for wildlife. Browse oriented species particularly favor these environments, especially in summer and winter. Wildlife includes turtles and snakes which are good sources of nutrition. High populations of deer, Eastern cottontail, rabbit, gray squirrel, wild turkey, muskrat (around swamp areas) and beaver are present (U.S. D.A. 1964).

Seasonal high abundance of floral resources is present in these areas for seeds (mid-summer to mid-fall) including such species as wild rice, sunflowers, common reed, giant fox-tail grass, golden club and smartweed; greens (spring to early summer) including goosefoot, greenbriar, poke and skunk cabbage; fruits (early summer to mid-fall) including persimmon, paw paw, wild black cherry, strawberry, huckleberry, blackberry and peach plum; and roots (year-round) including cattail, Jerusalem artichoke, arrow arum and arrow head (Thomas et al. 1975).

Fairly high populations of ducks occur in these areas, but little or no geese are present.

WELL DRAINED WOODLANDS

These areas exhibit good to extremely good drainage as defined by the Soil Conservation Service (Hall 1970, 1973). One problem with these areas can be excess drainage on some soil types such as the Lakeland soils. The soil types within this unit include: Evesboro Series, Matapeake Series, Sassafras Series, Downer Series, Galestown Series, Fort Mott Series, Steep Sandy Land, Lakeland and Norfolk. As with the poorly drained soils the main factor in determining soil distinctions is the difference between clay soils and sand or sandy loam soils.

The clay soil areas of good drainage are marked by the presence of Loblolly Pine as the predominant tree. Some areas of central Worcester County do have scrub pine in higher numbers than elsewhere. This dominance of pine is probably a reflection of historic land clearance, but the study area has probably always reflected a difference from the more northern areas of the Delmarva peninsula where hickory, chestnut and chestnut oak predominate. The most common deciduous species are sweet gum and white oak. Near shore areas sweet gum is present. Other common species include willow oak, spanish oak, sour gum, persimmon, dogwood, black haw, sassafras and hazelnut (Shreve 1910, Tatnall 1946).

The shrubs vary in intensity according to whether there is a predominance of deciduous or coniferous trees. Where pines predominate the shrubs are very scattered, whereas where deciduous trees predominate (as may have been the case prehistorically) the shrubs are more numerous. Where pine dominates shrubs include such species as wax myrtle, bayberry and groundsel tree. In other areas the shrubs include huckleberry, deerberry, high blueberry, and chokeberry (Tatnall 1946).

Herbaceous vegetation is poor in both species and numbers (Shreve 1910). Grasses and sedges are the most common species with panic grass and partridge pea as examples.

Where sandy loam soils predominate the coniferous trees often form pure stands under modern conditions. Even in mixed stands the conifers still predominate with loblolly pine and scrub pine being the representative species (Shreve 1910). The most common deciduous trees are spanish oak, white oak, black oak, post oak, willow oak, sweet gum, pig-nut, sassafras and dogwood. Less frequent are sour gum, red maple, holly, red cedar, persimmon and scarlet oak.

Shrub vegetation is variable in its presence but exceeds the levels found on the clay soils. The most common shrubs include: chokeberry, azalea, poison sumac, sweet pepperbush, ink berry and hercules club

(Tatnall 1946).

Herbaceous vegetation is generally rich and widely available. It includes bart, mill, wild indigo and pinweed (Tatnall 1946).

Of particular importance in the well-drained areas is the high production of nuts (mast). They are available from numerous trees from early to mid-fall. This availability attracts large numbers of mast oriented animals.

Fruits from shrubs in particular are found in medium abundance, but not to the same degree as in poorly drained areas (Thomas et al. 1975).

Seeds, greens and roots are not frequent in these areas.

Wildlife populations show low populations of rabbit, no muskrat, geese or ducks or beaver. High populations of squirrel, bear and turkey are present. Deer are present in medium sized populations. Raccoon, fox, elk, grouse and woodcock also occur (Thomas et al. 1975).

TRANSITIONAL AREAS

These are defined as areas which do not have the year-around standing water of the poorly drained woodlands and swamps, but do not have sufficiently good soil drainage to be as dry as the well drained woodlands. The soil types which the U.S.D.A. has identified for this type of area include: Keyport Series, Klej Series, Dragston Series, Woodstown Series, Mattapex and Mattawan.

The forest cover has oak as the dominant species with sweet gum, red maple, and pine (Shreve 1910, Braun 1950).

Shrub and herbaceous vegetation is best described as a cross between those species found in well drained and poorly drained habitats. These two habitat types can include transitions from marsh to well drained woodland, or from poorly drained woodland to well drained woodland. High animal food production and cover for nesting is characteristic. The increased sun light available at the edges of environmental zones produces maximum production of cover and browse. Medium size populations of rabbit, squirrel, deer, and turkey are present. Where tidal marsh is present, then high populations of muscrat are found. Medium levels of ducks occur around poorly drained woodland and tidal marsh transitions. Mink and weasel are very common in transition areas between marsh and poorly drained woodland (Thomas et al. 1975).

TIDAL MARSH AND ESTUARINE ENVIRONMENTS

Tidal marshes occur along low coastal areas and the tidal zones of streams and their estuaries. These areas really merge into the salt water bays and oceans environmental group as well, but the available resources of the latter are somewhat different and will be discussed separately. The transition between salt and fresh water environments is in reality very subtle and hard to delineate clearly but can be separated somewhat using the system presented by Metzgar (1973). These divisions include coastal shallow fresh marsh, coastal deep fresh marsh and coastal open fresh marsh.

Coastal shallow fresh marsh is found closest to the shore and along tidal rivers, sounds and estuaries. Soil is always waterlogged as a result of tidal inundation. Vegetation includes cattail, reed, big cordgrass, arrow-arum, pickerel weed, golden club, three square, panic grass, rose mallow, millet, swamp rose, rice cut-grass, water parsnip, waterhemp, saltmeadow, cordgrass, saltmarsh cordgrass, myrtle, hightide bush and groundsel bush (ibid).

Wildlife is heavily attracted to these areas for feeding. Medium populations of rabbit, mink and weasel occur. Deer, oppossum and fox are poorly represented but present. Muskrat and raccoon are present in high number year-round. Waterfowl such as ducks, geese and swans are heavily dependent on these areas for food. Most of the common birds of the eastern United States visit the wetlands at one time or another (Metzgar 1973). Grasses, reeds, and shrubs are important producers of seeds and roots.

Coastal deep fresh marsh occurs along tidal tributaries and meanders leading to bays, sounds and other estuarial areas of the Chesapeake Bay (Metzgar 1973). Soil is always covered by water at mean high tide. Vegetation includes wildrice, wild celery, smartweed, water-lily, arrow-arum, golden club, cattail, coontail, tearthumb and pondweed among others. These areas are also important food producing zones.

Coastal open fresh water areas inlcude shallow, but variable depth places of open water which occur along fresh tidal rivers and sounds. Vegetation can be absent, but may also include pondweed, muskgrass, and widgeon grass. All important waterfowl feeds in this area. Border areas have cattail, saltmeadow, cordgrass, reed, saltmarsh cordgrass, myrtle, hightide bush, groundsel and three square (ibid). Waterfowl heavily use these areas for feeding.

All estuarine areas support large populations of fish and shellfish. Oysters are found at the mouths of tidal rivers including the Nanticoke, Wicomico and Pocomoke as well as in Tangier Sound, and Pocomoke Sound (Lippson 1973). Hard clams and brackish water clams are extensively available in the waters of the study area, especially in Tangier and Pocomoke Sounds (ibid). Mussels and whelks are also available. The crab is a true estuarine species which occurs in all areas of nearly fresh water to full ocean strength salinity (ibid). No fresh water fish live in the estuarine areas except anadromous types such as gar, herring, white perch, sturgeon, striped bass and shad. Eels are present in all areas from the fresh water rivers to all areas of the Chesapeake Bay (ibid).

SALT WATER BAYS AND OCEAN

As mentioned previously, this micro-environmental type overlaps with tidal marsh and estuarine environments. Its primary difference is the availability of deep water food resources. These include such fauna as sharks, sea turtle, sea trout, drum and rock fish. The coastal salt water bays, including Assawoman, Sinepuxent and Chincoteague, extend the area of shellfish availability (Thomas et al. 1975, Lippson 1973).

PERMANENT FRESH WATER ENVIRONMENTS

These micro-environmental areas include the upper reaches of major stream channels which have water present in varying amount all year round. These areas disappear as the fresh water moves downstream where it is mixed with the brackish tidal waters. The so-called Carolina Bays which are roughly circular areas of extremely poor drainage may also contain standing fresh water for much of the year (Johnson 1942).

These areas are often surrounded by such U.S.D.A. soil types as Pocomoke Series, Johnston, Fallsington Series and Swamp, which, as discussed before, provide a rich growth of water-tolerant plant species. The fresh drinking water of these areas would have been attractive to both man and animal alike. Animals such as beaver, otter, mink and muskrat are all found in sizeable populations in these areas. Freshwater fish and turtles are also present. Yellow perch and catfish are present in large numbers (Lippson 1973).

NON-FOOD RESOURCE AREAS

The relationship of man to his environment is not based solely on the availability of food resources. Human culture is elaborately complex in its interactions with the environment. The results of this interaction often reveal themselves in the manufacture of items used in all aspects of human existence. The presence and distribution of the raw materials used in manufacturing useful (and sometimes not so obviously useful) items can be very helpful in predicting human behavior. For this reason some very preliminary research was performed during this study towards locating, in particular, lithic resource areas. Other resources such as clays, wood, reeds and grasses are also important, but their general availability within the study area does not make them as useful as lithic resource areas for the study of man-environment relations.

Lithics:

The only source of lithic material on the lower Eastern Shore of Maryland is found in deposits of Pleistocene silts, gravels and cobbles which rest unconformably on older rocks of the Delmarva peninsula. These deposits were thought to be transported by large blocks of ice being carried away from the melting glaciers above the study area by glacial meltwater. As these blocks of ice melted, they released large amounts of lithic material which had been frozen within them. Enough of these stones are of sufficient size to be useable for stone tool manufacture (Some stones as large as two feet in diameter were observed by the author in a cobble bed in Somerset County.).

The usable lithic resource areas which have been located in situations where they are exposed on or close to the surface or in stream beds include (see Figure 8):

1. Area at the mouth of the Nanticoke River (exposed in tidal flats).
2. Area west of Princess Anne, Somerset County.
3. Area south of Princess Anne, along King's Creek.
4. Area south of Federalsburg in Dorchester County.

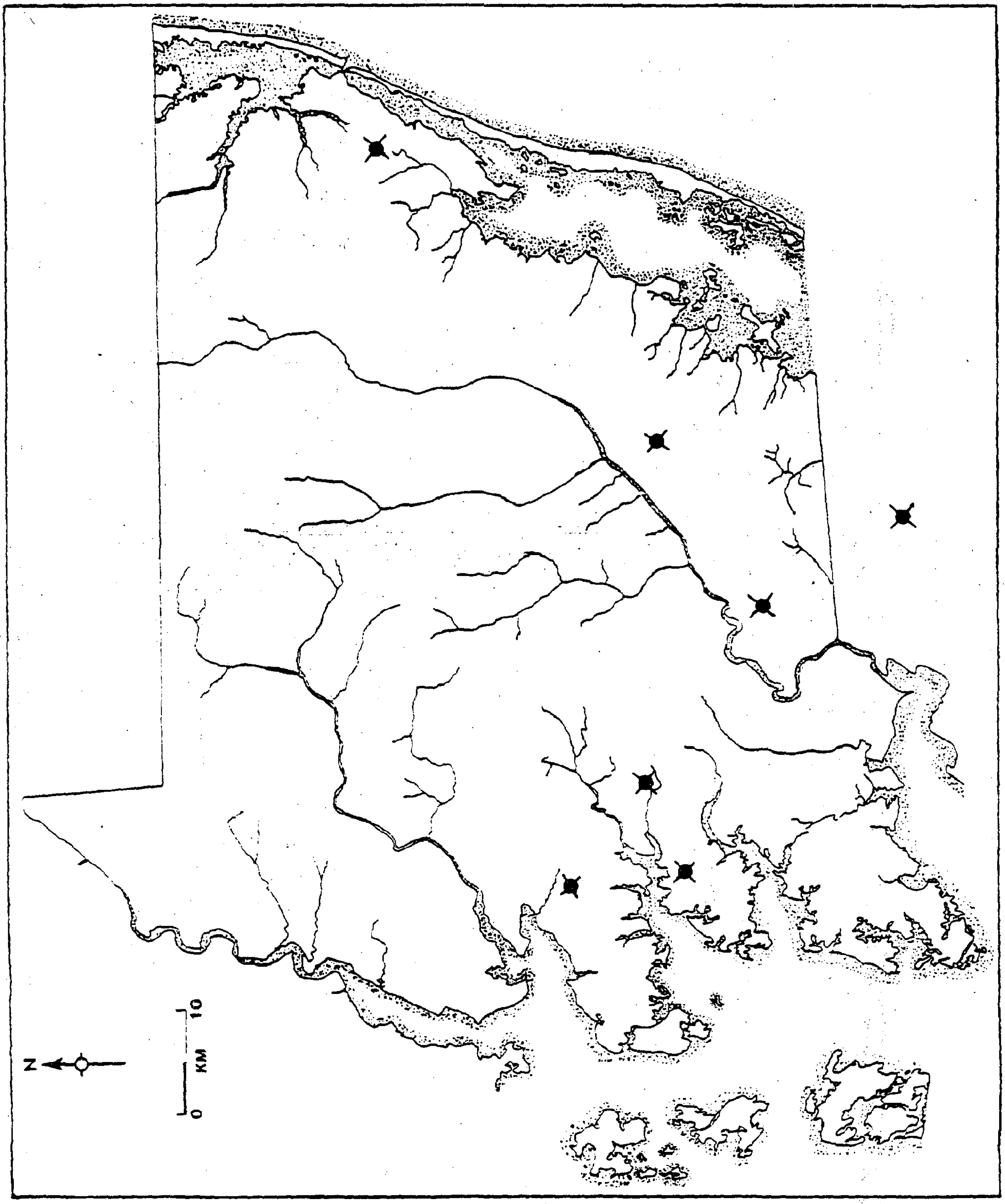


Figure 8 : LITHIC RESOURCE AREAS IDENTIFIED DURING STUDY. (Does not include 3 areas in Dorchester County)

5. A band running north-south beginning west of Cambridge, Dorchester County (just north of the study area).
6. Area south of Snow Hill, Worcester County.
7. Area south of Pocomoke City, Worcester County.
8. Area east of Berlin, Worcester County.
9. Area south of Back Creek on Fairmont Neck, Somerset County.

It is felt that all of these deposits would have been exploitable in prehistoric as well as early historic times. Furthermore artifact finds are closely associated with some of these sources and many of the artifacts studied for this report appear to be made from very similar if not identical raw materials. A program of physical tests for trace elements within the various lithic source materials and recovered artifacts could aid in answering whether or not these sources were supplying much of the raw material for the inhabitants of the study area during the various time periods in question.

CHAPTER VI: PALEO-ENVIRONMENT

Studies of present-day environments on the lower Delmarva peninsula are extremely useful in providing a basis for reconstructing cultural adaptation during the last 3000 years. However, problems arise in applying this environmental information to times earlier than 3000 years ago. The reasons for this difficulty lie in post-Pleistocene climatic changes which have affected the geographic distribution of micro-environmental zones primarily through the process of sea level rise. Plant and animal resource assemblages have also changed in response to these factors, thus causing alterations through time in available food and raw material resources. The process of post-Pleistocene sea level rise had perhaps the most far-reaching effect on the resources available to man during the past 12,000 years. Sea level rise will be discussed after briefly outlining the paleoclimatic changes which occurred following the end of the Pleistocene and the effects these changes had on plant and animal life.

PALEOCLIMATIC SEQUENCE AND ENVIRONMENTAL CHANGE

The climatic shifts which have occurred since the end of the last Ice Age some 10,000 years ago had great effects upon the environment and the human groups who lived within them. In order to understand these changes in climate, a number of techniques have been used including studies of pollen, soil, geomorphology and botanical remains. No analyses have yet been completed within the study area dealing with these climatic changes for all periods, but by utilizing the results of research performed in surrounding areas an analogy can be drawn between the paleoclimatic episodes of these areas and Maryland's lower Eastern Shore. The studies which provide us with applicable research data have been performed in the Coastal Plain of southeast Virginia (Whitehead 1965, 1972, 1973) the mouth of the Chesapeake Bay (Harrison et al. 1965), southeastern North Carolina (Frey 1953, Whitehead 1963, 1964, 1965, 1973), New Jersey (Serkin and Stuckenrath 1975), at Bloodsworth Island in the Chesapeake Bay (Demarest, N.D.) and for the Full and Post-Glacial episodes in the Central Delmarva Peninsula (Serkin et al. 1977).

Problems arise, however, in applying the climatic and vegetational sequences from these areas to the lower Eastern Shore of Maryland. First, while a general climatic developmental model may be characteristic of the Middle Atlantic region as a whole, micro-environmental factors at work such as soil texture, drainage characteristics, latitude and altitude can have important effects on the plant and animal life of any one area. These factors must be kept in mind when trying to develop and draw conclusions from a sequence of paleoclimatic change.

The latest evidence reported for the Middle Atlantic region indicates that climatic change following the last ice age occurred in the form of a series of relatively stable episodes which were broken by rapid climatic shifts (Bryson 1970). Work by Carbone (1976) has generated a general sequence of these episodes for the Middle Atlantic region. This discussion will utilize Carbone's episode sequence as a basis with which to compare evidence from the areas listed above. The vegetational sequences presented must be seen as representing only a general outline of the areas involved as great diversity within different micro-environmental zones must have been present during at least some of the episodes.

The Full Glacial episode, dated 10,700 B.C. and earlier, represents a cold-to-cool and wet climate in the Middle Atlantic region (Carbone 1976:104). In southeastern Virginia an open spruce, pine forest with some fir present and high levels of non-arboreal pollen (NAP) was changing to a more closed forest by around 13,000 B.C. (Whitehead 1972). Further south in North Carolina, a pine-rich boreal episode is being replaced by a more "northern hardwood" forest with rising oak percentages (Frey 1953) by 10,000 B.C. To the north in unglaciated areas of New Jersey, pine predominates with a secondary presence of birch and spruce giving way to the Late Glacial forests where temperate deciduous species arise such as oak (Carbone 1976:38). Conditions within the study area probably closely resemble those of both North Carolina and New Jersey with pine dominating the assemblage and spruce being present in sizeable amounts during the Full Glacial episode. This taiga and tundra association seems to have persisted until ca. 12,500 B.C. on the Delmarva peninsula. Spruce was present along the Pocomoke River as late as 7,000 B.C. showing that a cold climate persisted in the area well into Late Glacial times (Serkin et al. 1977). Fauna from this period may be infered for the study area by the presence of sloth, mastodon, mammoth, caribou, moose, bison and musk ox at Saltsville, Virginia dated to 11,460±420 B.C. (Ray et al. 1967). At the New Paris Sinkhole #4 in Pennsylvania similar faunal remains are dated as late as 9300±1000 B.C. (Guilday et al. 1964).

The Late Glacial episode, dated from 10,700 B.C. to 8500 B.C. for the Middle Atlantic region exhibited slightly warmer conditions than in the Full Glacial (Carbone 1976:105-106). In southeastern Virginia a continuation of spruce and pine is indicated, but a drop in non-arboreal pollen argues for a denser forest environment with increases in birch and alder (Harrison et al. 1965). In North Carolina, the pine rich episode gives way to a more northern hardwood association with oak, beech and hemlock reaching maximum levels. This seems to occur somewhat earlier in North Carolina than in Virginia, probably reflecting the more southern location (Whitehead 1965). In New Jersey, the dominance of pine with spruce and oak associated, suggests a Late Glacial oscillation where oak and other deciduous species are present, but then disappear as spruce, pine and fir species dominate. The study area seems to show a constancy of species present with variations in the amount of hemlock (also noted in New Jersey) probably being the result of pollen blowing in from the west and the south (Carbone 1976: 44). In total, the nature of the Late Glacial episode seems episodic to the south, but relatively more stable in the region of the middle Delmarva peninsula with a very gradual increase in deciduous species occurring. The glacial fauna seems to have also gradually disappeared to be replaced by those animals which are characteristic of the present day temperate environment. Data from the New Paris Sinkhole in Pennsylvania shows the replacement of glacial fauna to be complete by 7200 B.C. (Guilday 1967).

The pre-Boreal episode, dated from 8500 B.C. to 7200 B.C. in the Middle Atlantic, had a cooler drier climate (Carbone 1976). Evidence from southeastern Virginia indicates a "northern hardwood" association with beech, hemlock, birch and oak characteristic (Whitehead 1972, Harrison et al. 1965). North Carolina pollen cores indicate a dominance of oak and hickory with pine percentages low (Whitehead 1965). In New Jersey pollen studies indicate a pine dominance with birch secondary. The study area in the central Delmarva region probably represents a blending of the more southern forests and the northern areas in the form of an oak dominance with hickory present as in North Carolina, but with pine and birch also being represented as in New Jersey. The presence of cypress in the study area probably indicated increased ground moisture in some areas due to a rising water table.

The Boreal episode, dated in the Middle Atlantic region from 7000 B.C. to 4500 B.C., indicates a continued pattern of cool, dry climate (Carbone 1976). In southeastern Virginia the northern hardwood forest continued with an increase in sweet gum and the grasses and sedges (Whitehead 1972). In North Carolina the dominance of oak and hickory gave way to pine domination with oak being secondary (Whitehead 1965). The New Jersey data indicates a similar pine-oak domination with oak having replaced hickory as the secondary dominant species (Sirkin et al. 1977). The study area probably closely parallels the developments in North Carolina and New Jersey, with a pine and oak association much like the present day situation arising.

The Atlantic episode, from 4500 B.C. to 3000 B.C., is characterized by a warm, moist episode which is followed by warmer, drier conditions (Carbone 1976). In southeastern Virginia the northern hardwood forest with sweet gum association gave way in the latter part of the Atlantic episode to an oak, hickory forest with a rise in the presence of pine (Whitehead 1972). In North Carolina oak, hickory, black gum and somewhat later cypress dominate (Whitehead 1965). Both New Jersey and the study area probably had developed a vegetational cover very similar to present day.

The sub-Boreal episode from 3000 B.C. to 1000 B.C., was characterized by warm, dry temperatures continuing with highest average temperatures occurring around 2300 B.C. in the Middle Atlantic as a whole (Carbone 1976:192). In southeastern Virginia this episode is marked by an increase in cypress and gum species, probably reflecting the increase in "swamp forest" conditions with the Dismal Swamp area where the pollen samples were taken (Whitehead 1965). A similar rise in cypress and gum species undoubtedly occurred within the study area as what is now the Pocomoke River Swamp arose. In North Carolina a gradual increase in the presence of pine occurs (Whitehead 1972). The study area probably reflected a stabilizing environment with present day pine-oak assemblages expanding and river swamps becoming established as extensions of the Dismal Swamp areas to the southwest (Whitehead 1972).

The sub Atlantic episode, in effect, extended from ca. 1000 B.C. until European contact. (Several short term climatic episodes did occur which would have had little effect.) The sub-Atlantic is characterized by a mild, wet climate in the Middle Atlantic region (Carbone 1976:192). In southeastern Virginia an increase in cypress and gum continues within the Dismal Swamp, but pollen evidence from Wachapreague Inlet on the Atlantic Coast indicates a present-day oak-pine-hickory association (Carbone 1976:54). In North Carolina pine dominates the vegetational assemblage unlike in southeastern Virginia (Whitehead 1965). This is probably a result of adaphic conditions associated with the sandy soils of the area. This same pine dominance is noted in the study area and most likely the sandy soils of the lower Eastern Shore of Maryland are likewise responsible for this phenomenon.

It must be kept in mind that the sequence presented above is only a very general presentation of the dominant species of each climatic episode. Secondary species and the full diversity of vegetational growth cannot be determined at this time and thus the nature of the complete prehistoric resource base cannot be known. The diversity of the micro-environmental mosaic seen within the study area at present was also likely to be present during many of the earlier climatic episodes. This limits the ability to predict resource distribution and availability for the different time periods. Hopefully, further work on a micro-environmental level within the study area will aid in providing this information.

Figure 9 provides a summary of the environmental episodes discussed above.

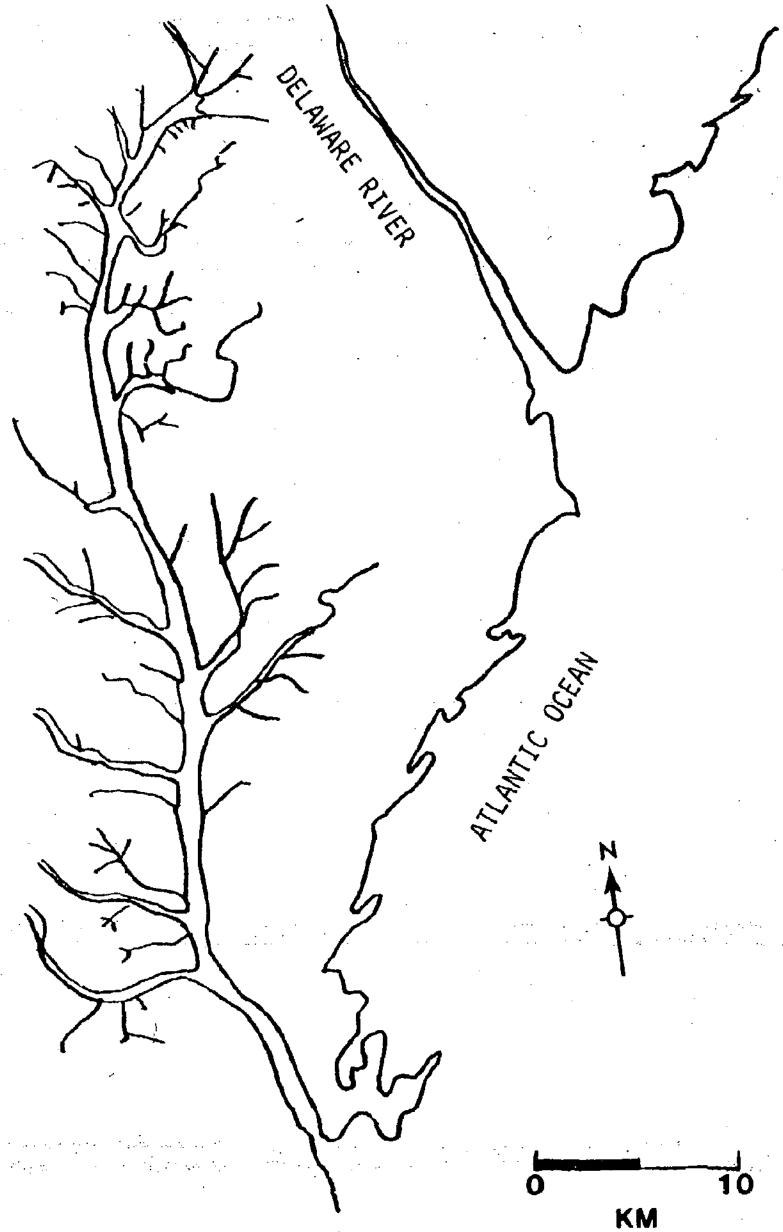
DATE	Episode	Climate	Central Delmarva	N. Carolina	New Jersey	SE Virginia	Sea Level Rise- Atlantic	Chesa. Bay
1000 AD								
500				pine				
BC - AD	sub - Atlantic	mild, wet				oak, pine, hickory (cypress, gum)		
500								
1000							-3.5 m	-5.0 m
1500								
2000	sub - Boreal	warm, dry						
2500				cypress				
3000						oak, hickory Orontium & ferns Pine inc.	-7.0 m	-11.0 m
3500		warm, dry		black gum				
4000	Atlantic	warm, moist						-15.0 m
4500								
5000			Similar to present ?	pine, oak	pine, oak	sweet gum, grasses & sedges	-14.0 m	
5500	Boreal	cool, dry						
6000								
6500								
7000			oak, hickory, birch, cypress, pine	oak, hickory		"Northern Hardwood" beech, hemlock, birch, oak	-22.7 m	
7500					pine, birch			
8000	pre - Boreal	cool, dry						
8500								
9000				oak, beech, hemlock (less than in Va.)				
9500	Late Glacial	cold, wet						
10000							-25.5 m	
10500			pine, alder, spruce, hemlock, birch, Northern shrubs & herbs					
11000						pine, spruce, Low NAP		
11500				pine rich, spruce	pine, spruce, oak			
12000	Full Glacial	cold, wet						-30.0 m
12500				Boreal				
13000					spruce, pine, fir			
13500				pine	Park Tundra	High NAP spruce, pine, fir		
25000								

Figure 9 : SUMMARY OF ENVIRONMENTAL CHANGE AND SEA LEVEL RISE

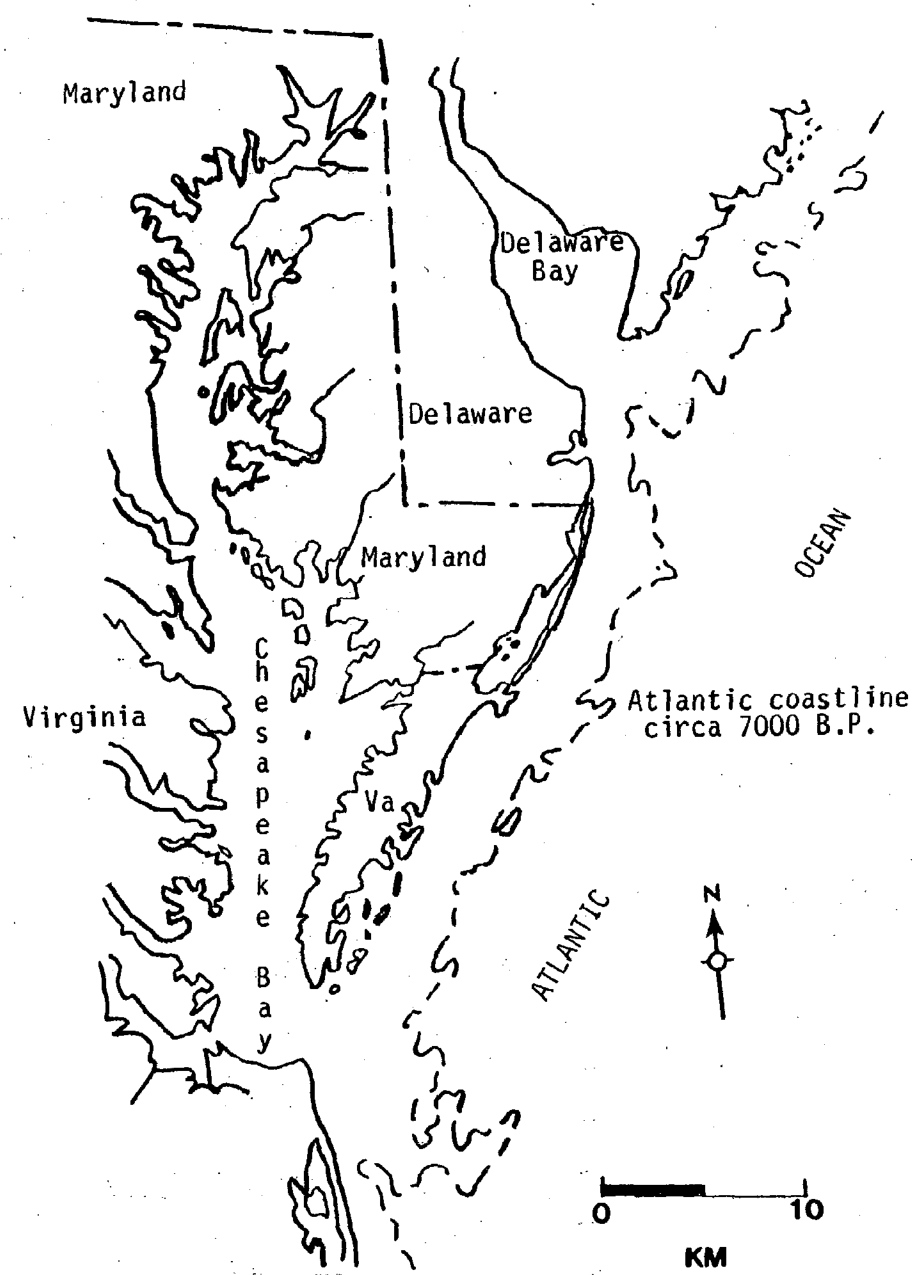
SEA LEVEL RISE

The geography of the Atlantic coastal plain, which includes most of the Demarva Peninsula and the Chesapeake Bay, is the result of a changing geologic history that has included the rise and fall of sea levels beyond present limits at least ten times during the Quarternary Period (previous 1.5 million years). This sea level rise and fall resulted from the growth and shrinking of the earth's polar ice caps during the successive Ice Ages. During Ice Ages vast amounts of the free water on the earth's surface were locked up in the form of ice and snow. As this frozen water never melted after formation, the amount of liquid water decreased and sea levels fell. The height of the last Ice Age, the Wisconsin, occurred approximately 14,000 to 18,000 years ago (Kraft and John 1978). During this time sea level was around 130 meters below its present level (Edwards and Merril 1977:3). As temperatures rose and the ice began to melt by about 10,000 B.C., sea level began to rise and the shore line transgress inland at an initially fairly rapid rate (ibid:2). Many opinions exist as to the rate of sea level rise, but it's agreed by all researchers that the two processes of eustatic rise and tectonic subsidence combine to produce a relative rate of shoreline inundation for any particular area of the Middle Atlantic coastal zone. See Figure 10 for a summary of Chesapeake Bay and Atlantic coastal changes since 7000 B.P.

The rate of inundation seems to have been rapid at first with a decrease in sea level rise coming about during later times. This de-



SUSQUEHANNA RIVER DRAINAGE CIRCA 7000 B.P.
(After Wilke and Thompson 1977)



CHESAPEAKE BAY AND ATLANTIC OCEAN REGION TODAY WITH ATLANTIC SHORELINE CIRCA 7000 B.P. SUPERIMPOSED (After Wilke & Thompson 1977)

Figure 10

creasing rate of sea level rise is documented all along the Middle Atlantic coast. In Connecticut Bloom and Stuiver (1963:334) state:

> From 7000 to 3000 years ago submergence was at the rate of 0.6 foot per century; during the last 3000 years the rate has been only half as great.

In New Jersey Stuiver and Daddario (1963:951) observe:

> All areas show a rapid submergence until 2000 to 3000 years ago and a much reduced rate from that time until the present.

Just above the study area on the Delaware coastal plain, Kraft (1971: 2131) noted this:

> Initially, sea level advanced rapidly across the coastal plain from 300 to 350 feet below the present, at rates greater than several feet of sea level rise per century. From approximately 8000 B.P., relative sea level rose at a continuing rate of about 1 foot per century. From 3700 years before present, relative sea level rise has been at a rate of slightly under .5 feet per century based on evidence from the Delaware coastal area.

While the rate of sea level rise has obviously varied along the Atlantic coast, probably a result of tectonic differences, it is clear that a rapid inundation occurred initially followed by a slower rate of rise from around 3000 years ago continuing until the present. This process of sea level rise and the changes which accompany it have far-reaching implications for the study of the earliest human populations on the Delmarva Peninsula. The coastal and riverine environments of both the Atlantic and Chesapeake Bay sides of the peninsula would be affected by the shifts in bordering environmental zones. Accompanying changes of climate would affect the vegetation and animal life available for exploitation.

In order to better understand the possible implications of sea level rise on the study area, research conducted in Delaware by Kraft (1978) and by Demarest et al. (n.p.) on Bloodsworth Island in the Chesapeake Bay will be used as examples of the possible paleogeographic settings to which early human populations had to adapt through time.

The Cape Henlopen occupancy sites in Delaware occur at the confluence of a major estuary, the Delaware Bay, and the Atlantic coast (Kraft 1978:55). This setting may reflect similar coastal settings of the study area where rapid migration and reformation of coastal environments occurred. Between 14,000 and ca. 9000 B.C. the Atlantic seacoast was 100 to 150 kilometers east of its present location (Edwards and Merrill 1977: 33). Pollen and vegetational studies from cores drilled in these areas indicate that fairly level plains, lakes and lagoons supported spruce, pine and fir trees among other vegetation (ibid:34). Paleo-fauna is known to have included mammoth, ground sloth, caribou and walrus (ibid:9). This is the time when paleoindian period hunter-gatherers would have presumably inhabited this area, although no actual cultural materials have ever been recovered in direct association with fossil remains. Presumably the rivers and streams emptying into the Atlantic, lakes and lagoons, and the estuarine areas accompanying them also offered rich resources of fish, shellfish and marine mammals. By ca. 5500 B.C. (Early-Middle Archaic period) at Cape Henlopen tidal salt marsh fringed a coastline which was still to the east of the present day shore. By ca. 2000 B.C. (Late Archaic Period) the shoreline was still to the east and a series of coastal lagoons lay along a relatively straight low-lying cliff-beach. These lagoons would have been a rich source of shellfish.

By 400 B.C. (Middle Woodland Period) a number of shellmiddens are present at Cape Henlopen indicating exploitation of a coastal environment which included narrow necks of land forming coastal barrier and sand dune areas with tidal marshes behind them (Kraft 1978:57). This type of development with capes, oceans, bays and adjacent coastal lagoons and salt marshes continued up until present day. A lagoon barrier shoreline fringed by broad coastal marshes and at times invaded by estuaries of drowned rivers and streams was constantly transgressing in an eastward direction and forcing early populations to adapt to this shore migration along the entire Atlantic coastline (ibid:59).

A common geological feature of the study area is sand ridge or hill formations presumably dating to the last glacial episode (see discussion later under critical areas). These ridges seem to have a high number of occupancy sites present on them, at least in certain areas, and are of interest especially where they occur in relation to a drowned surrounding topography. The site of Island Field in Delaware presents such a ridge or hill in a situation where it is surrounded by tidal salt marsh adjacent to a shallow broad estuary (Kraft 1978:52). The setting of the Island Field site may be analogous to numerous sites and areas within the study area and will be looked at with this in mind. Kraft's (1978) paleogeographic reconstructions show the site to be located in an upland area next to the freshwater Murderkill River and adjacent to the tidal confluence of the St. Jones and Murderkill Rivers with associated tidal marsh areas around 8000 B.C. (Paleoindian Period). By ca. 4500 B.C. the earliest occupancy of the site occurred when the tidal estuary area where the two rivers came together lay approximately one kilometer to the northeast. Both this estuary and the rivers exhibited strong tidal influences with marsh lining their banks. The present Delaware Bay was still a good distance away from the site. By 1000 B.C. the site was within two kilometers of the Delaware Bay with extensive tidal marsh areas and fresh water swampy depressions nearby. By Middle to Late Woodland times, ca. 1000 B.C., the site was on a small peninsula of dry land, surrounded by tidal marsh and freshwater swampy depressions, and within one kilometer of the Delaware Bay. Kraft (1978:55) sees the Island Field site as being attractive because it was initially located inland from the Delaware Bay, but in an area of good transportation along the tidal Murderkill River. A lack of Late Woodland period shell middens is cited as a possible reflection of this location.

The paleogeographical development of the Chesapeake Bay area of the Eastern Shore can be traced to some extent by recent work done on Bloodsworth Island in Dorchester County just above the study area (Demarest et al. in press). Bloodsworth Island lies in Tangier Sound about five miles from the mainland. The water separating it from the Delmarva Peninsula is at most fifty feet deep. Most of the island is presently covered by salt marsh. Prior to 3000 years ago, the island would have been part of the drainage divide between the Nanticoke River and the Chesapeake Bay, although it would have been much narrower at this time (ibid:1). The Chesapeake Bay itself was formed by rising sea level inundating the pre-Holocene Susquehanna River drainage basin. Associated sub-estuaries such as the Pocomoke, Wicomico and Nanticoke Rivers would have experienced similar sequences of development as outlined by Steponaitis (1980:18-19) for the Patuxent River drainage valley existed in pre-Holocene times. Around 4000 B.C. when sea level was about minus 15 meters in the Bay, the area was mostly dry land (Demarest et al.:4). By ca. 1000 B.C. the rivers were deeper, but not wider due to the steep river valley walls. Fringing marshes were present in upstream areas where tidal effect was probably present already. During the next 2000 years sea level rise slowed considerably, but still rose about 3 to 4 meters. Dry land still predominated until ca. 500 years ago, but with slowed sea level rise fringing marsh areas with saline plant assemblages were probably abundant. As the flatter, more level upland areas were flooded during the last 1000 years before present, these salt marsh areas grew to cover great expanses and the island itself arose and was flooded until today little dry land remains (ibid:6).

The overall implications of this continuing process of sea level rise for archaeological research lies in the fact that the earliest period sites (Paleoindian and Archaic Periods) would now be submerged in most instances. Use of marine and estuarine resources is indicated as early as the Middle Archaic on the Delmarva Peninsula (Wilke and Thompson 1977). Therefore, the subsistence and settlement patterns of these earliest periods will be difficult if not impossible to understand with the evidence at hand and the danger of a land-oriented bias must be avoided.

Figure 9 summarizes sea level position during the different time periods.

CHAPTER VII: SYNTHESIS

Utilizing the chronology which was developed in Chapter III as a framework, the information gathered from analyzing the various collections can now be discussed in regard to the distribution of artifact and site types as they relate to environmental setting and temporal variation. This information will be used to define critical areas where particularly high densities of cultural material from multiple time periods exist. These "critical areas" are seen as being the potentially most useful regions for study and interpretation of the prehistory and early history of Maryland's lower Eastern Shore andultimately the entire Delmarva Peninsula.

The data utilized in this chapter is compiled in Appendix I and II. Appendix I lists for each site collection examined the following information: 1. site location; 2. site description; 3. site maps (if available or visited); 4. site inventory number (if available); 5. collector or owner name ad address and; 6. components identified. Appendix II includes a preliminary discussion of data gathered from aerial photographs and from the Landsat earth resources satellite. This data is used to aid in defining critical areas where collector interview data is lacking or scarce.

PALEO-INDIAN PERIOD

All occurrences of Paleoindian components within the study area relate to isolated finds of fluted projectile points. No actual complete sites dating to this period are known on the lower Eastern Shore, although such sites do occur within the Middle Atlantic region. Almost undoubtedly, this scarcity of Paleoindian sites within the lower Delmarva Peninsula is a result of the process of sea level rise discussed earlier. This process was underway by at least 12,000 B.C. with the result that any sites located next to either riverine or coastal environments are now submerged.

The traditional subsistence model for the Paleoindian Period, has seen these people as big game hunters, primarily of extinct pleistocene megafauna such as mammoth and mastodon, but also of smaller animals such as caribou and deer (Gardner 1979:4). The environment during early Paleoindian times seems to have been a mosaic of mixed vegetation which included parkland and more open mixed coniferous forest (Carbone 1976). Pleistocene megafauna is known to have been present as close as Virginia and Pennsylvania (Ray et al. 1967; Guilday et al. 1964), but Paleoindian artifacts have never been found in the Middle Atlantic region in undisputed direct association with extinct mammalian bones. Thus, environmental evidence does seem to agree with a primary hunting-focus during the Paleoindian Period.

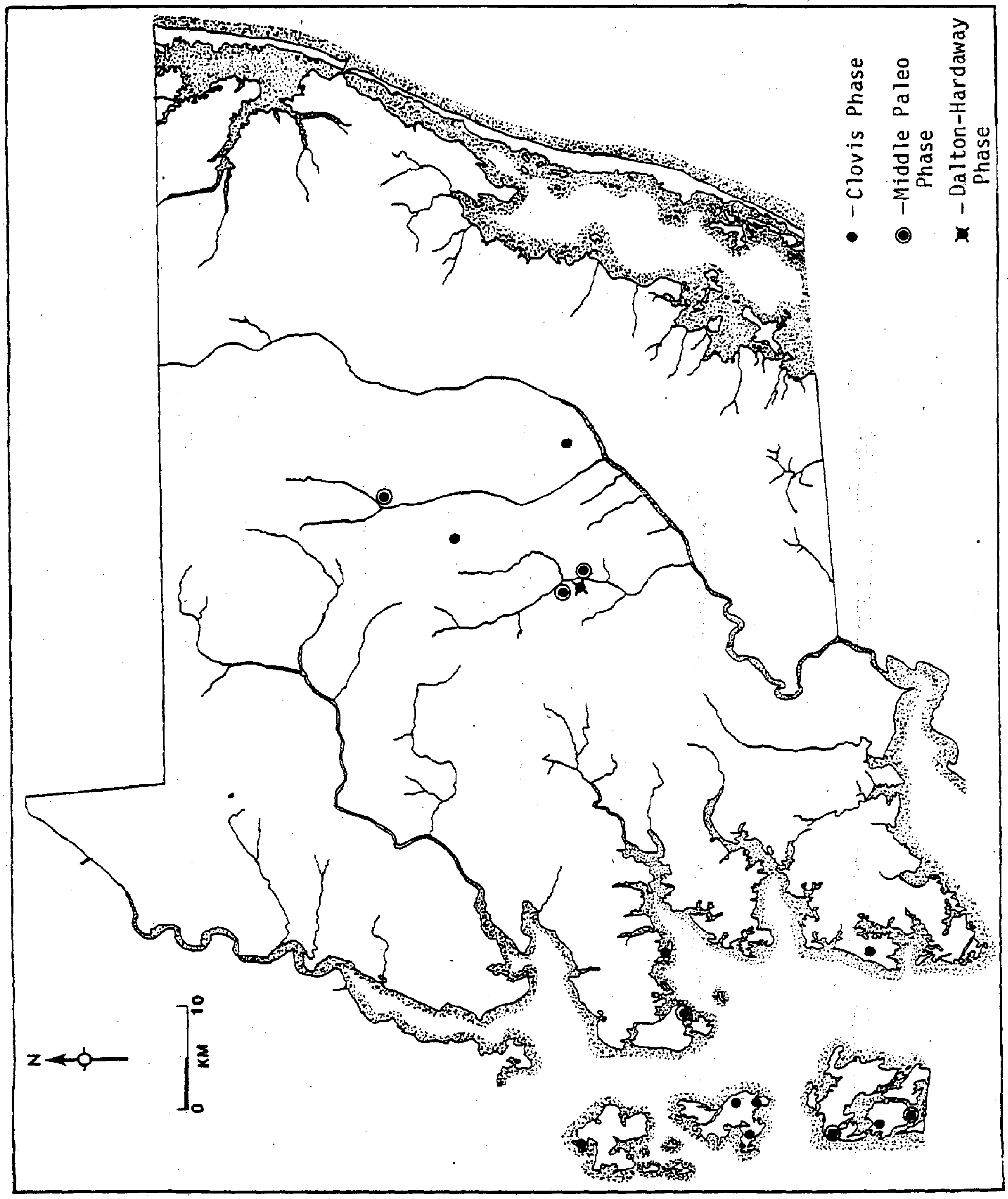


Figure 11 : PALEOINDIAN - TOTAL SITES

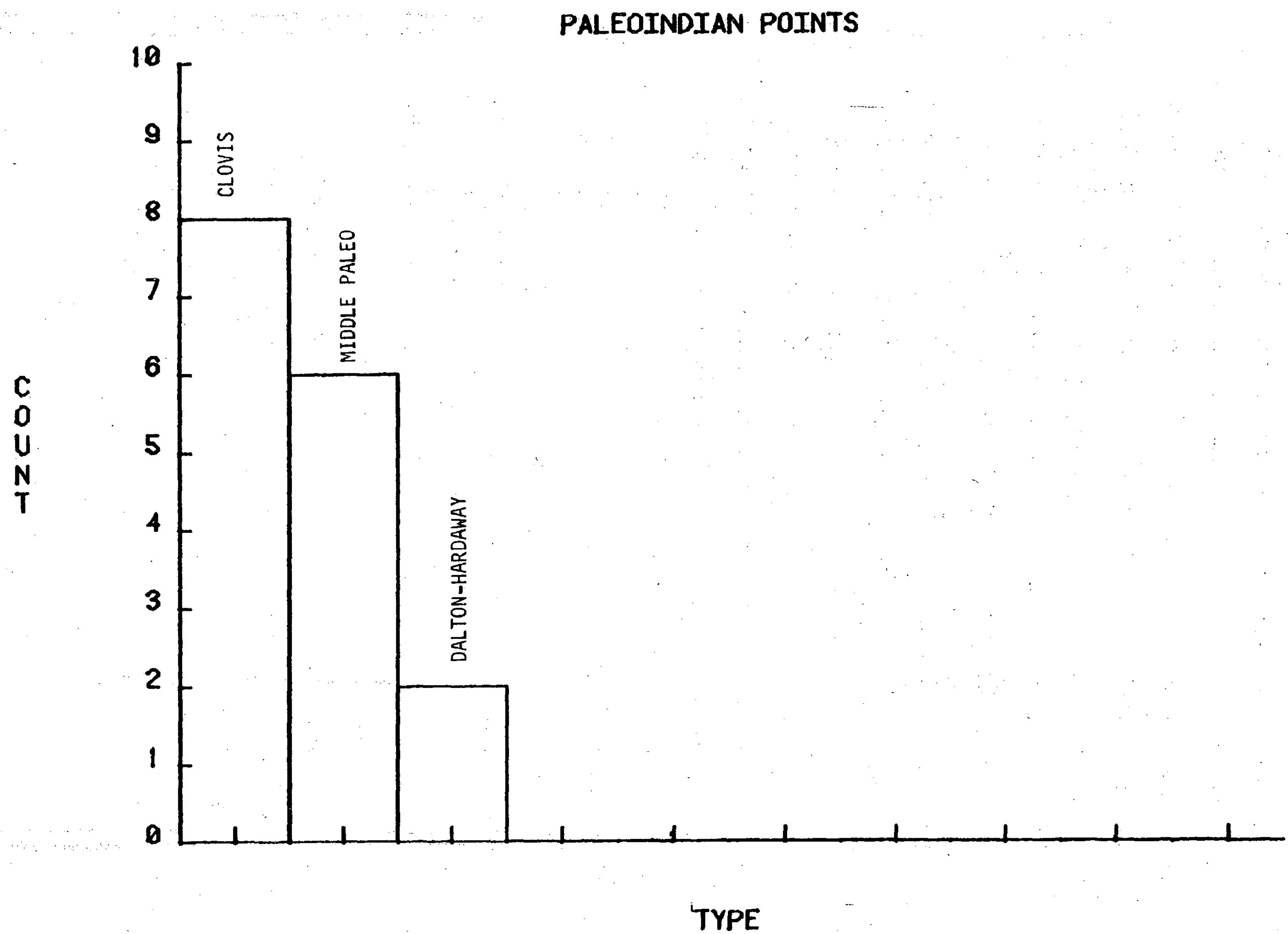

PALEOINDIAN POINTS
COUNT
10
9
8
7
6
5
4
3
2
1
0
CLOVIS
MIDDLE PALEO
DALTON-HARDAWAY
TYPE

Figure 12

Further evidence supporting a primary hunting orientation seems to lie in the artifact assemblages from known Paleoindian sites. These assemblages include such tools as scrapers, gravers, drills, knives, hammerstones, bifaces and wedges (Gardner 1974, Coe 1964, Kinsey 1972). These are the type of artifact which would most probably be used in processing hunted animals by cutting the meat from the carcass, preparing hides and fashioning implements from bones.

Gardner (1974) proposes some possible settlement patterns associated with the Paleoindian Period based on work in the Shenandoah Valley of Virginia. He sees three kinds of basic site types: the quarry-related sites; base camps; and outlying hunting camps. Gardner feels that proximity to lithic raw material sources and freshwater are the two primary factors at work in base camp location. He also mentions closeness to animal migration routes or "overlook" areas as being of possible importance in upland locations (ibid: 43).

The application of the above model to the lower Eastern Shore of Maryland should be done with caution. First, the environmental evidence from the study area (see Chapter VI) shows that by the end of the Paleoindian Period (ca. 7500 B.C.) the mixed coniferous forest/parkland mosaic was giving way to a more closed "northern hardwood" association of birch, oak and hickory. The Pleistocene megafauna would have been replaced by a fauna similar to that found today as the open grassland areas were replaced by forest or lost to sea level inundation. This evidence would tend to support an earlier orientation toward hunting the large Pleistocene fauna with a later shift (by ca. 8500 B.C.) toward a more

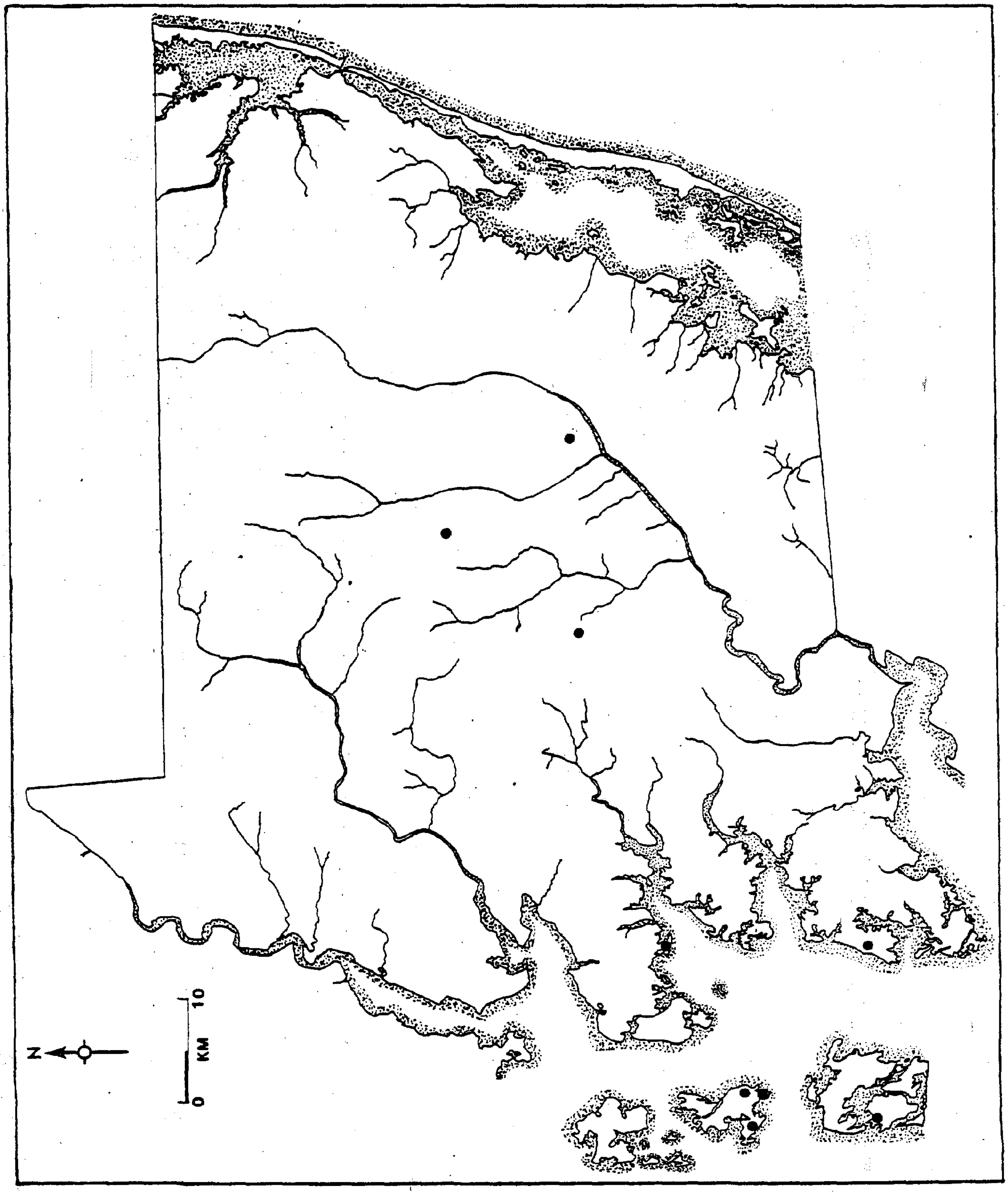


Figure 13 : PALEOINDIAN - CLOVIS PHASE

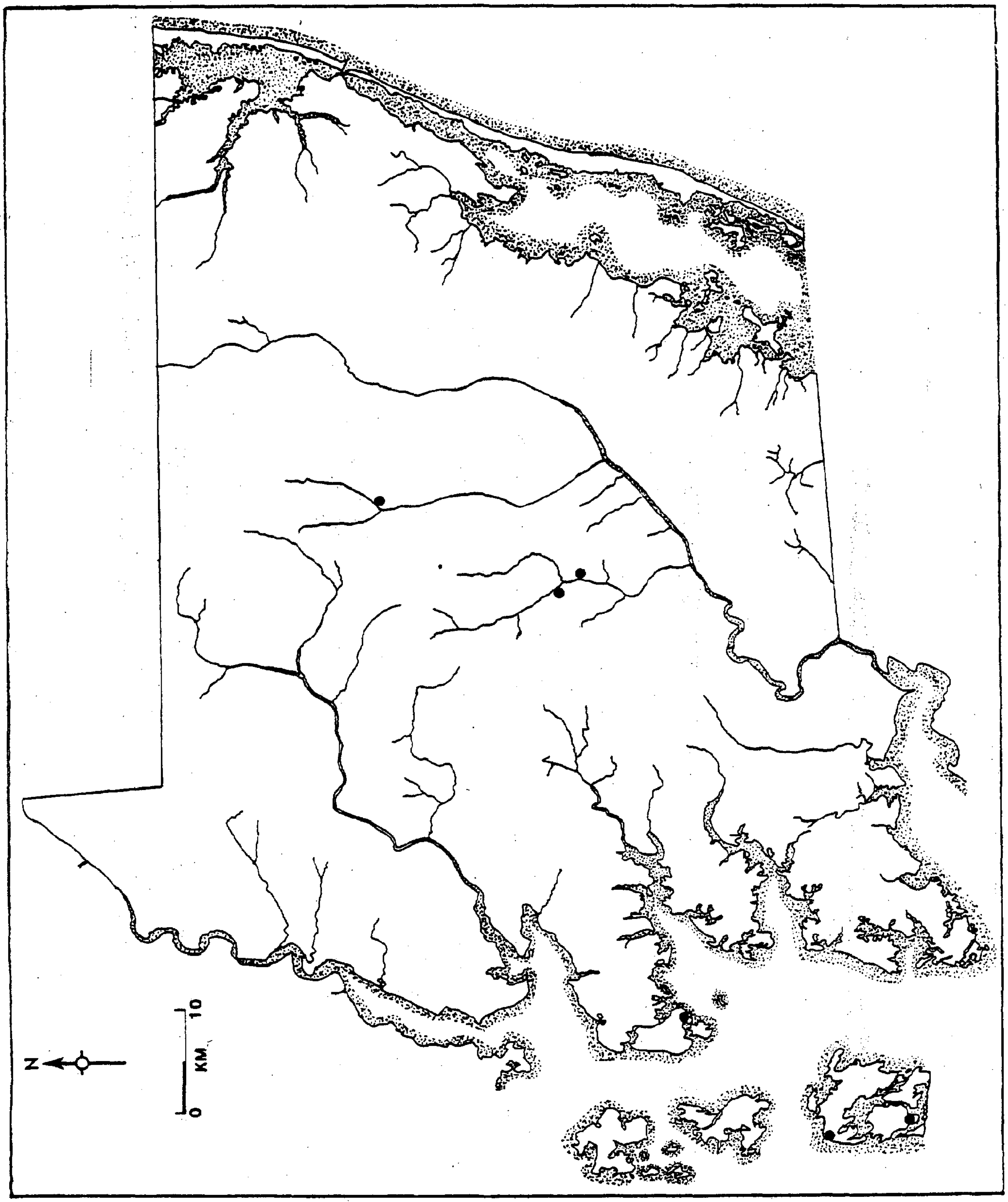


Figure 14 : PALEOINDIAN - MIDDLE PALEO

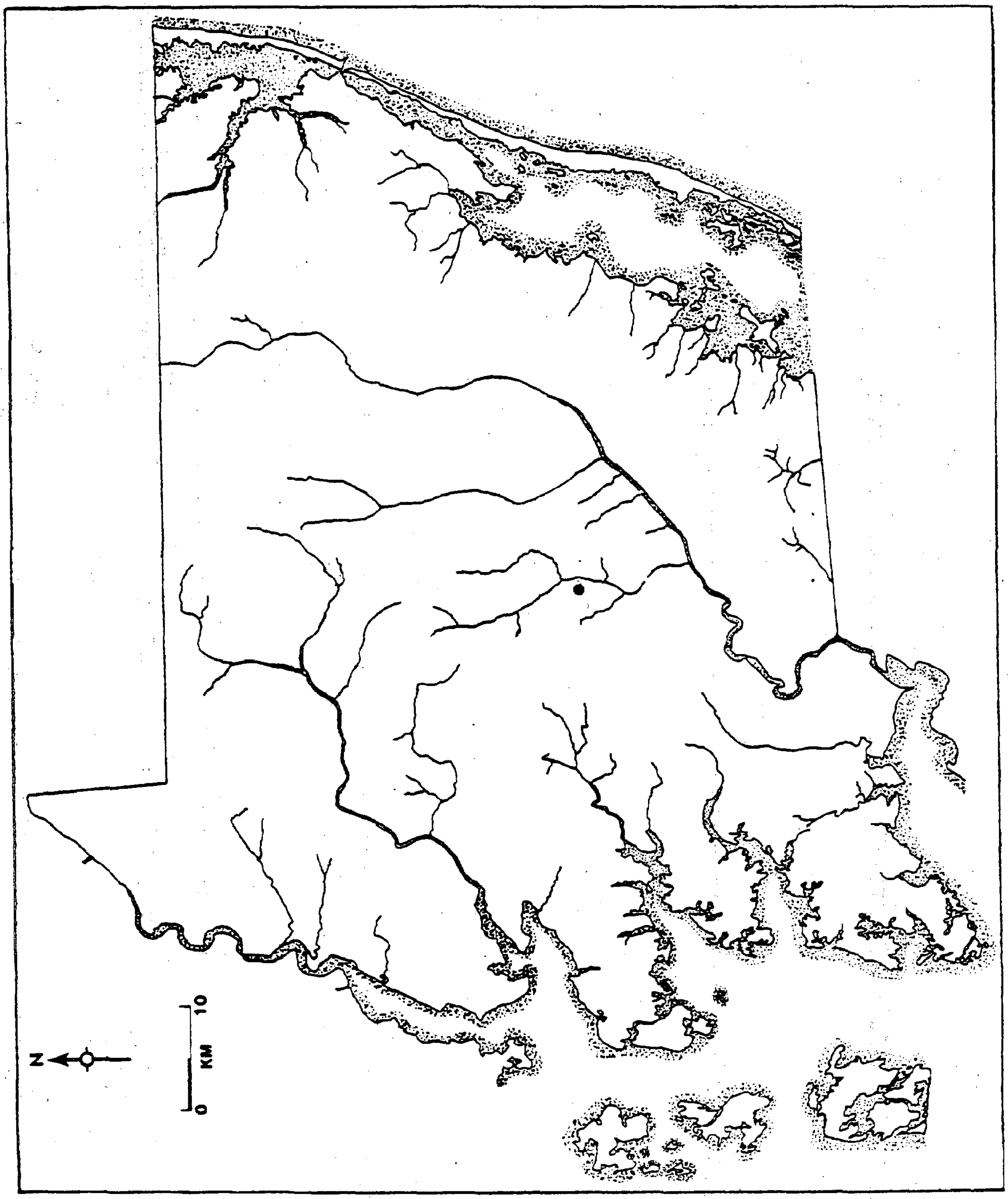


Figure 15 : PALEOINDIAN , DALTON - HARDAWAY PHASE

diffuse economy where both plant and marine/riverine resources were gathered in addition to the hunting of large and small land animals. Data from the Shawnee-Minisunk site in the Upper Delaware Valley shows the presence of hawthorne pits and fish bones from a hearth by 8640±300 B.C. (McNett et al. 1977:284). This seemingly supports the view that a more diverse hunting and gathering economy existed in some areas by at least the Middle Paleoindian phase.

The location of sites during the Paleoindian Period appears to reflect a preference for location in areas with numerous small ponds or sink holes known as Carolina Bays on the Delmarva Peninsula (Thomas 1976). Large poorly drained areas thought to be post-Pleistocene lakes or marshes also seem to have been preferred (ibid). The location of cobble beds of usable lithic raw material in numerous areas of the Delmarva Peninsula do not seem to be primary site location areas as Gardner's model would predict. Paleoindian point finds within the study area occur associated with stream and river drainage channels (see Figures 11, 13, 14 & 15), but factors such as collecting bias and inundation of lowland areas make assessment of site location criteria difficult.

For points which could be examined, chert was the most common raw material used, with one point being fashioned from quartzite and another from rhyolite (this was a Hardaway point where raw material assessment was difficult). See Figures 16, 17 and 18.

Overall, it seems likely that by the Middle Paleoindian phase a more diverse economy including both hunting and gathering had arisen within the study area as a result of environmental and other factors.

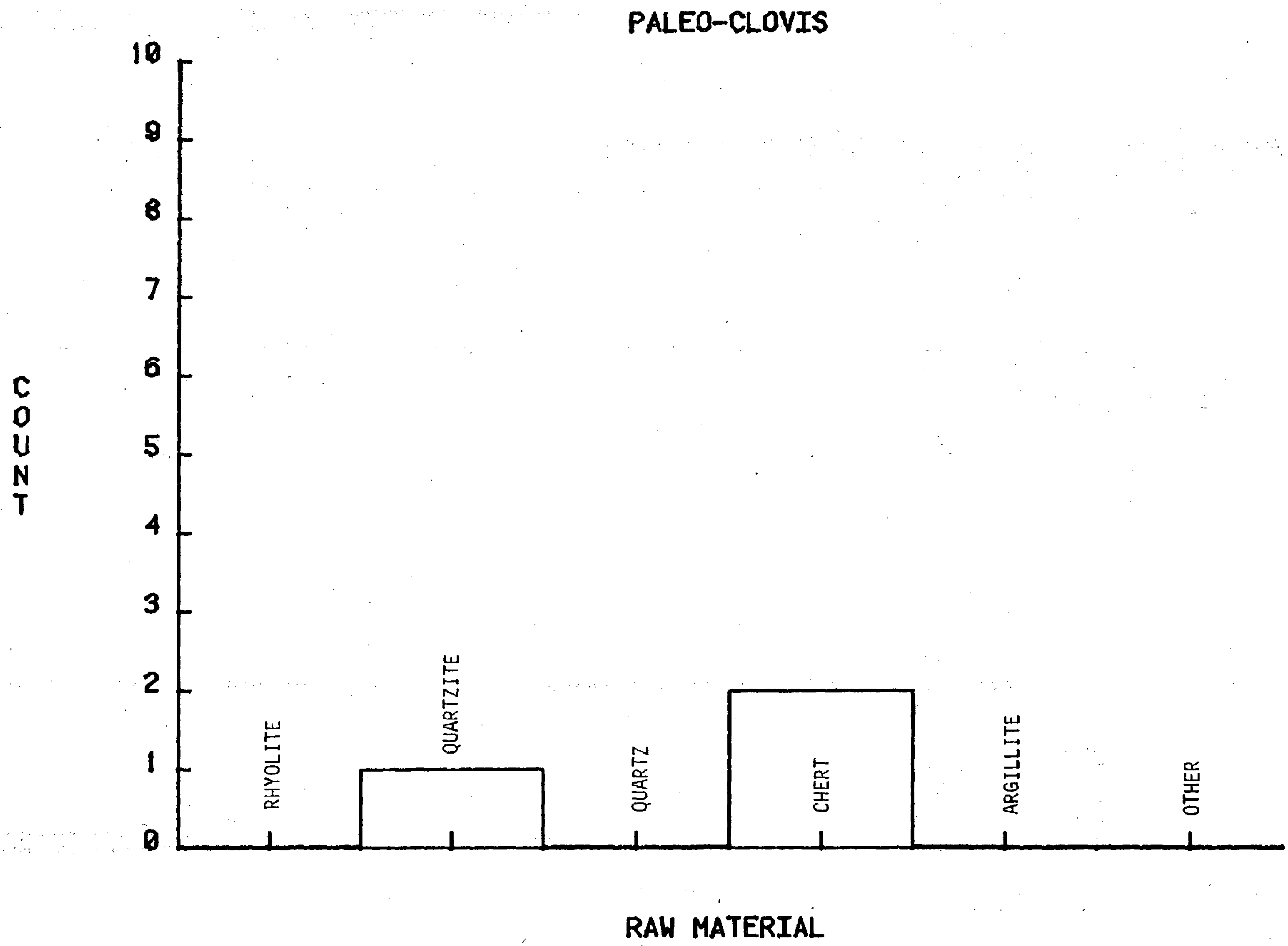

PALEO-CLOVIS
10
9
8
7
6
5
4
3
2
1
0
COUNT
RHYOLITE
QUARTZITE
QUARTZ
CHERT
ARGILLITE
OTHER
RAW MATERIAL

FIGURE 16

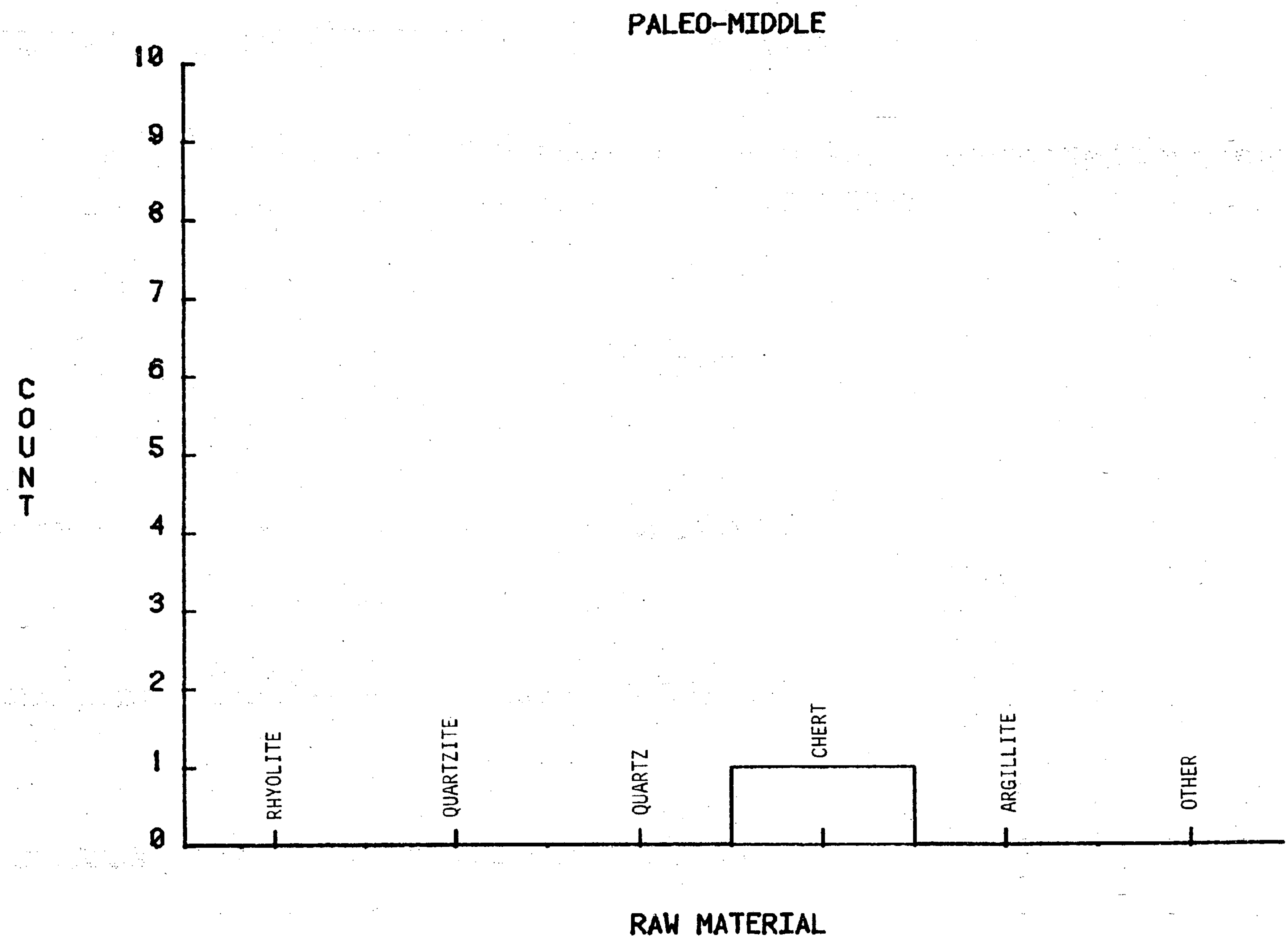

PALEO-MIDDLE
COUNT
10
9
8
7
6
5
4
3
2
1
0
RHYOLITE
QUARTZITE
QUARTZ
CHERT
ARGILLITE
OTHER
RAW MATERIAL

FIGURE 17

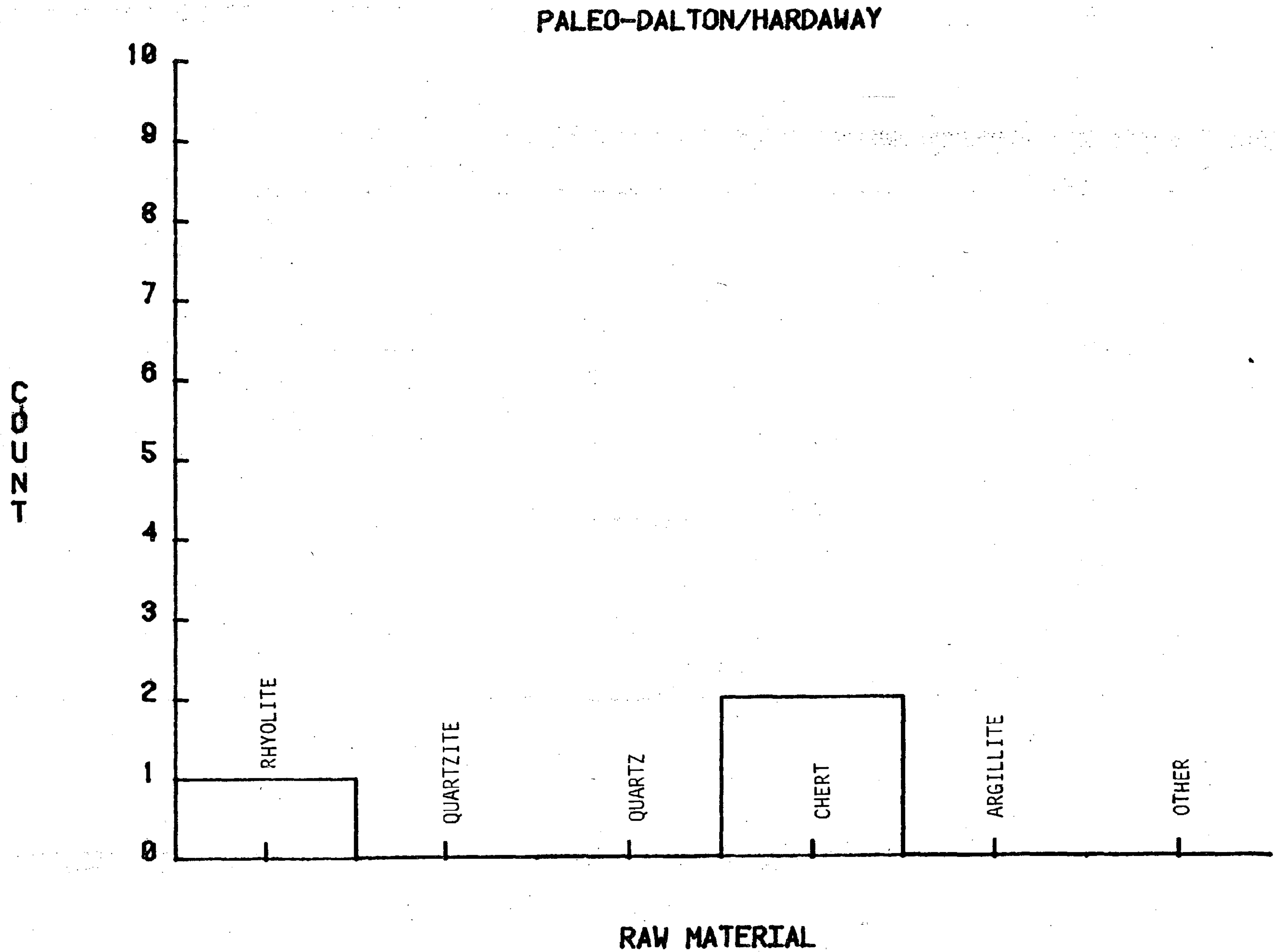

PALEO-DALTON/HARDAWAY
COUNT
10
9
8
7
6
5
4
3
2
1
0
RHYOLITE
QUARTZITE
QUARTZ
CHERT
ARGILLITE
OTHER
RAW MATERIAL

FIGURE 18

The primary subsistence emphasis was likely still on hunting, but exploitation of a more diverse resource base was likely to have also been occurring to a substantial degree.

EARLY ARCHAIC PERIOD

The Early Archaic Period, lasting from approximately 7500 until 6000 B.C., occurs at a time of environmental change when the Eastern Shore expression of the northern hardwood forest was being supplanted by a forested environment similar to today. A predominance of oak and pine with areas of swamp forest including such species as cypress and gum was coming to be the primary forest association. Species of Pleistocene fauna would have disappeared with a faunal assemblage very similar to today's being present. The Atlantic shoreline lay at least 8 to 10 kilometers to the west of its present location as a result of sea levels being approximately 22 meters below its current level. Inundation of the Chesapeake Bay was occurring with associated flooding of the lower reaches of the major river drainage systems taking place. The possible effects of these changes will be discussed below as they relate to the dual traditions of the Early Archaic.

Corner-Notched Tradition:

This tradition includes the Early Archaic I Phase (7500-7000 B.C.) and the Early Archaic II Phase (7000-6800 B.C.). The artifactual marker of this stage is a technological change from fluting as a means of haft-

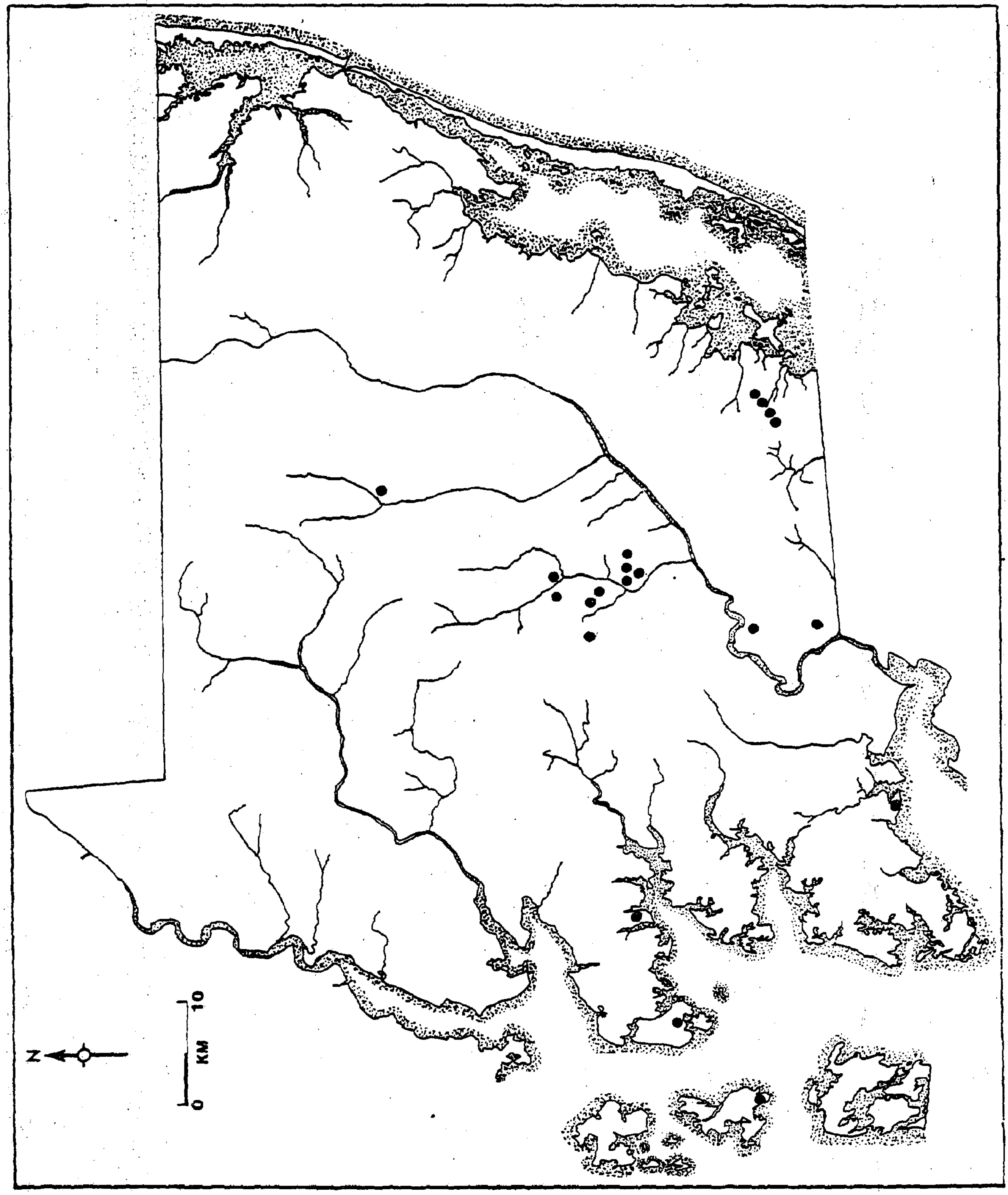
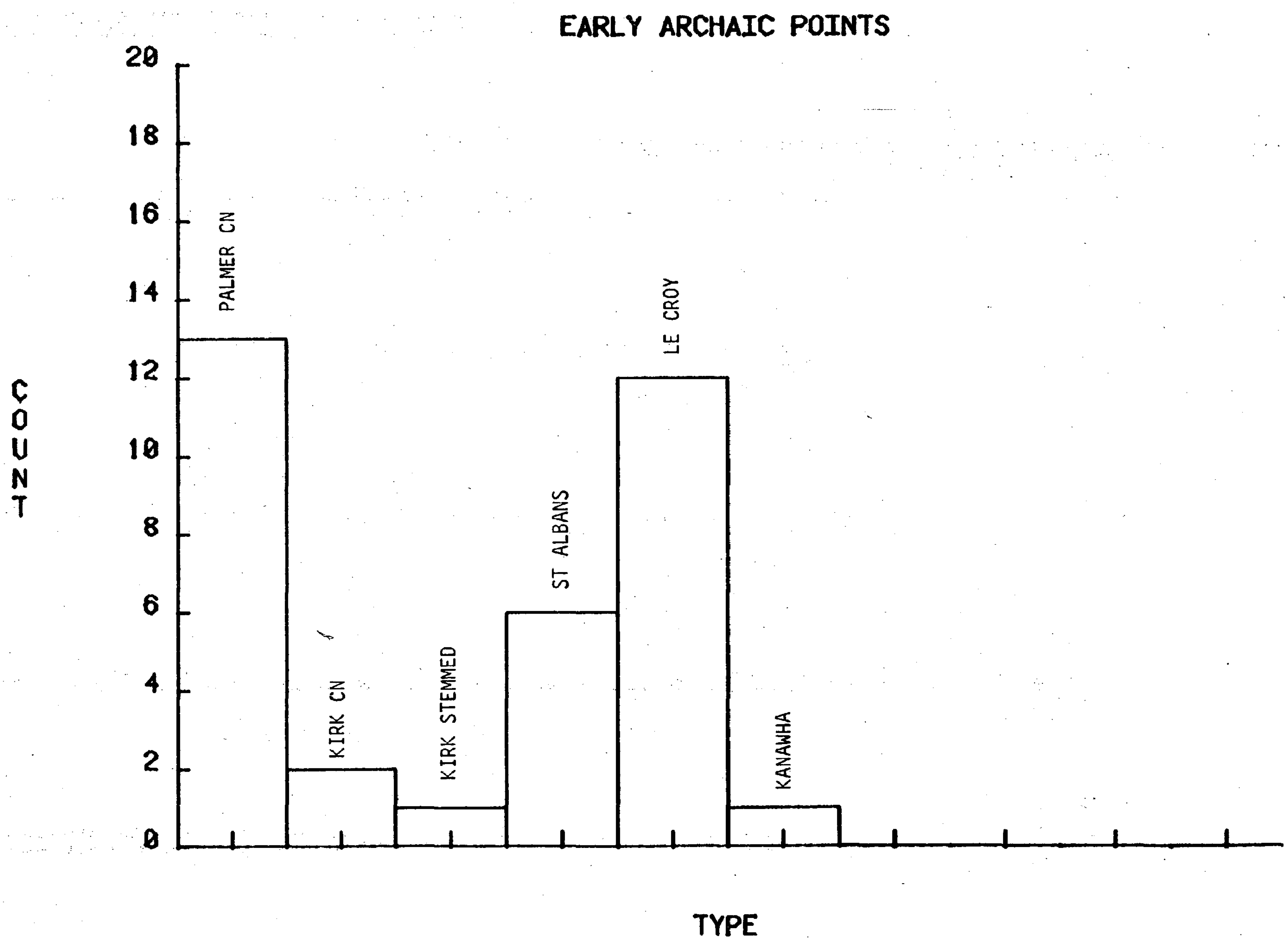


Figure 19 : EARLY ARCHAIC - TOTAL SITES



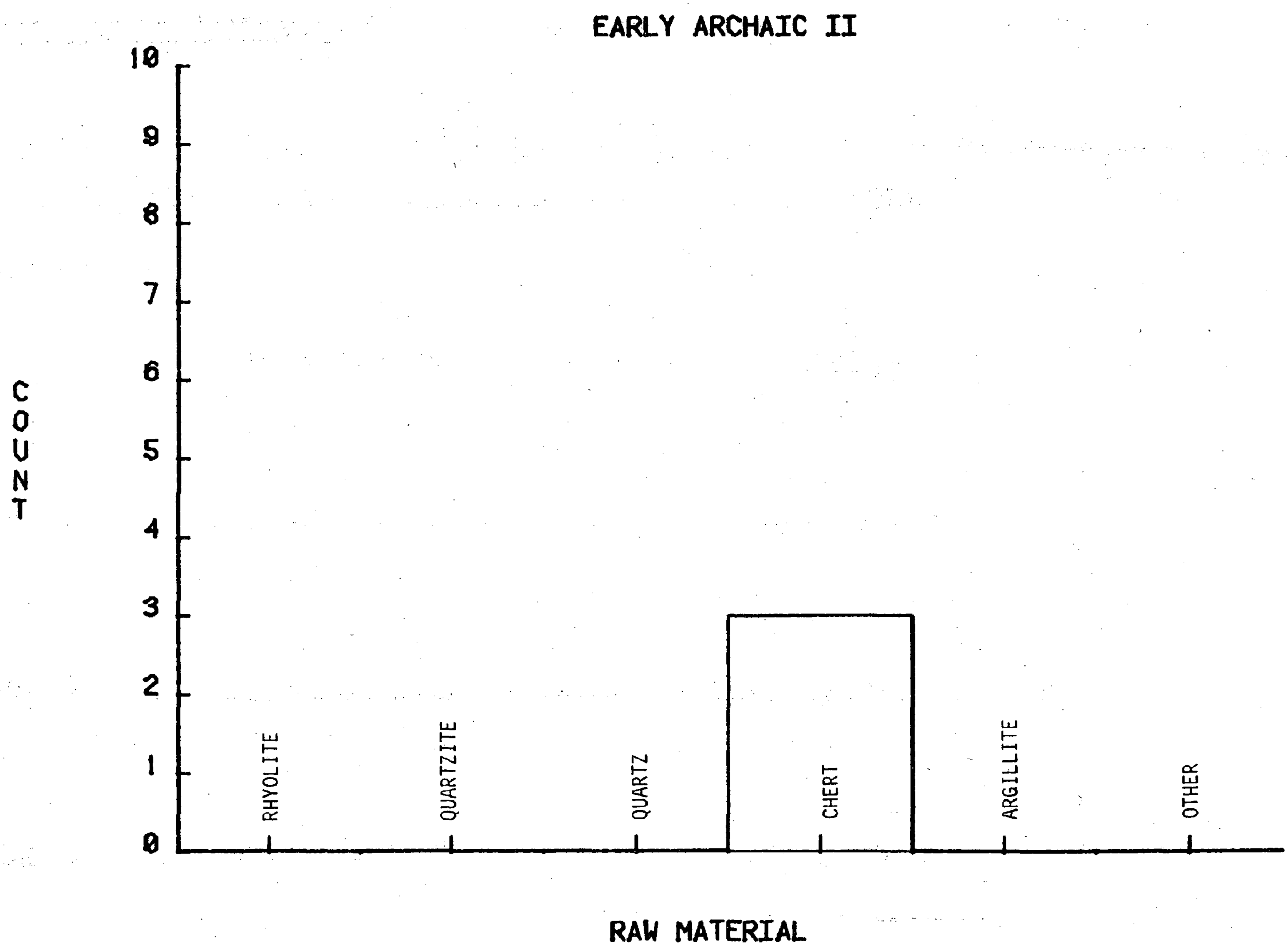
EARLY ARCHAIC POINTS
COUNT
20
18
16
14
12
10
8
6
4
2
0
PALMER CN
KIRK CN
KIRK STEMMED
ST ALBANS
LE CROY
KANAWHA
TYPE

FIGURE 20

ing to corner-notching. Edges of these projectile points also often show serration.

The Palmer points of the Early Archaic I phase are much more common in collections than the later Kirk points of the Early Archaic II phase. A predominant use of local cryptocrystalline chert raw material marks both the earlier and later phases with non-local argillite being utilized for fashioning a Palmer point in one instance. This use of raw materials does not agree with evidence from the Patuxent River drainage on the Western Shroe where non-local rhyolite was extensively used during the later phase manufacture of Kirk points (Steponaitis 1980:68). This evidence seems to suggest that while some contact was occurring with other areas as seen by the use of argillite in one instance, the favored raw material source was the local cobble beds of the region (See Figures 21 and 22).

Gardner suggests that the change reflected in the switch to corner-notched projectile points is the result of a new hunting strategy which was needed due to behavioral differences between the parkland adapted Pleistocene fauna and the modern fauna of the deciduous forest. This model does not see a cultural adaptation based on seasonal exploitation of varied resources arising until later, instead prefering to see this tradition as a continuation of Paleoindian subsistence patterns. Vegetational evidence secured by flotation of the Rose Island site in Tennessee indicates that hickory (most common), acorn, butternut and honey-locust were being exploited as sources of plant food by at least the late Early Archaic (Chapman 1975). Evidence for a diet based at



EARLY ARCHAIC II
COUNT
0
1
2
3
4
5
6
7
8
9
10
RHYOLITE
QUARTZITE
QUARTZ
CHERT
ARGILLITE
OTHER
RAW MATERIAL

FIGURE 21

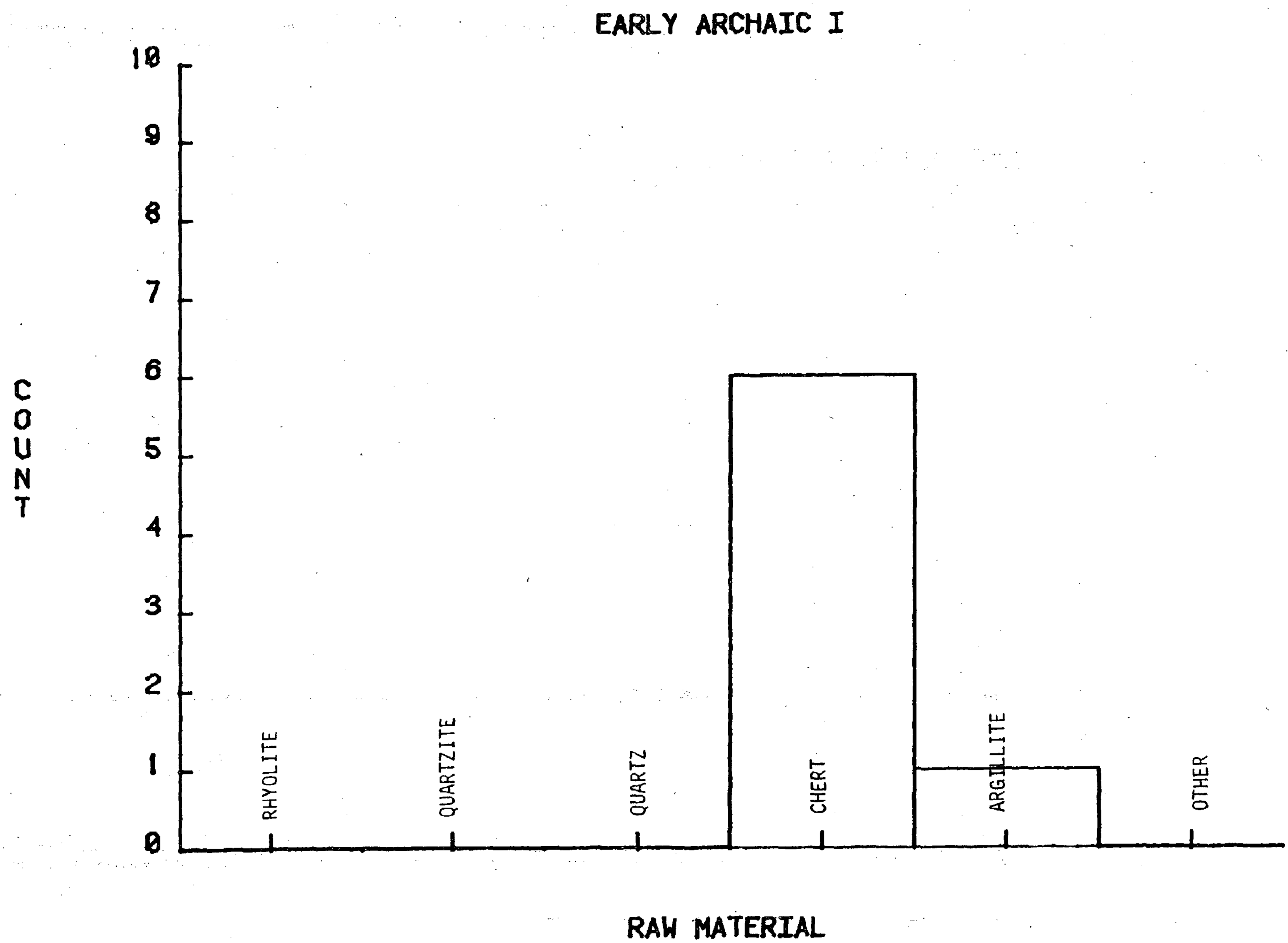

EARLY ARCHAIC I
COUNT
10
9
8
7
6
5
4
3
2
1
0
RHYOLITE
QUARTZITE
QUARTZ
CHERT
ARGILLITE
OTHER
RAW MATERIAL

FIGURE 22

least partially on foraging is further backed up by the presence of nut remains and hoes in the Kirk levels at the St. Albans site in West Virginia (Broyles 1971). Steponaitis (1980:69) correctly points out that many tools associated with hunting and butchering tasks could just as easily have been used in the processing of plant foods. Lithic use-wear studies could aid in answering this question.

The Dill Farm Site in Kent County, Delaware is a large Archaic site spanning the entire Early Archaic. It is situated on a well-drained ridge adjoining a sluggish stream with extensive fresh water swamps nearby. This highly productive environmental setting seems to be mirrored within the study area (see Figures 23 and 24) where sites of both phases are associated with either river or stream drainage areas where well-drained sand ridges occur near poorly-drained woods or swamps. This environment is likely to be similar to what would have been present during the Early Archaic although many sites would have since been lost due to sea level rise. The very productive Chance Site in Somerset County is a good example of such environmental placement. Thus, it seems likely that a diverse hunting and gathering economy was well established by the beginning of the Early Archaic Period in which all of the resources of a rich and varied environmental setting were being exploited.

<u>Bifurcate Tradition</u>:

The Early Archaic Phases III, IV and V are marked by the presence of St. Albans, LeCroy and Kanawha bifurcated base points respectively.

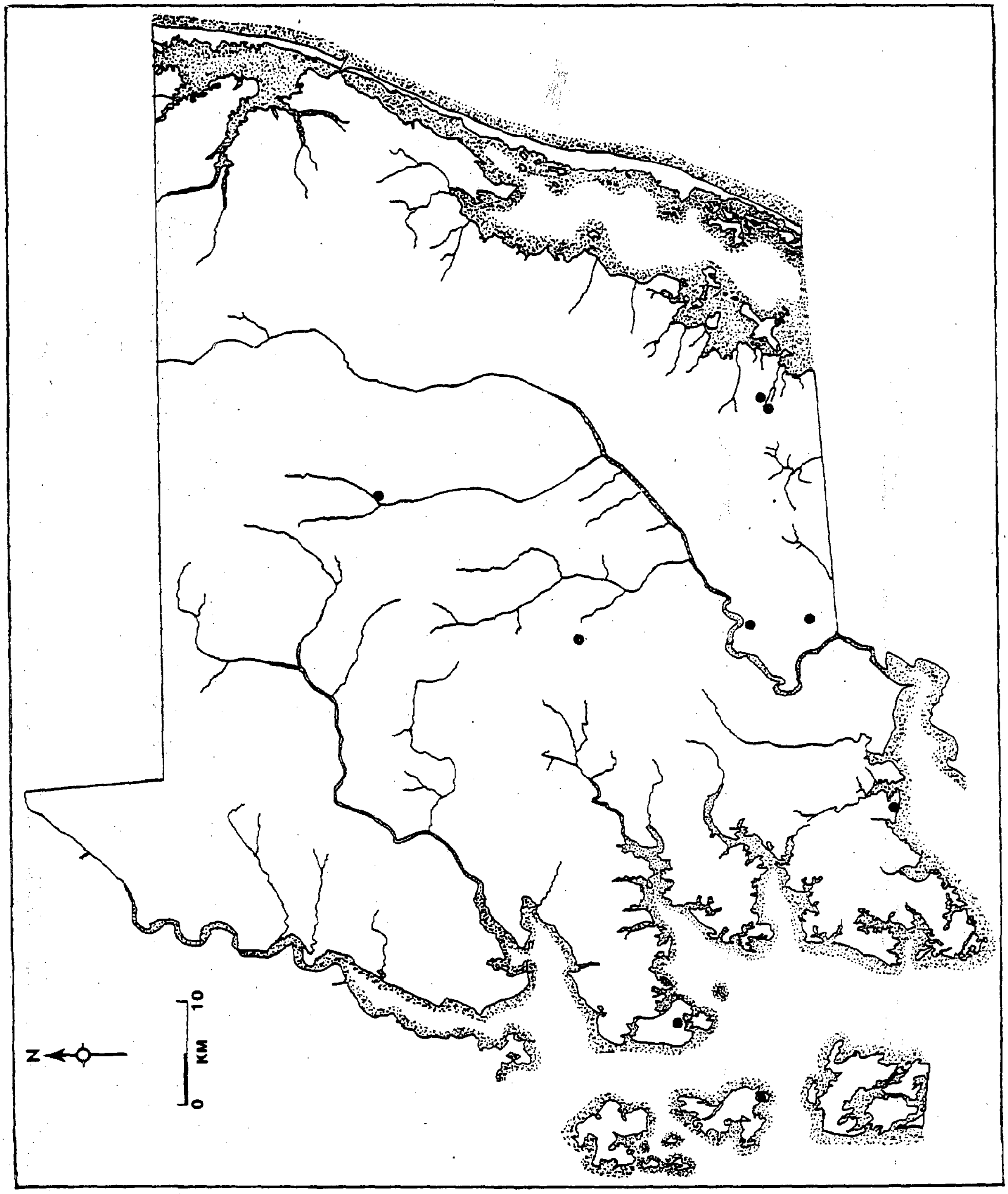


Figure 23 : EARLY ARCHAIC I

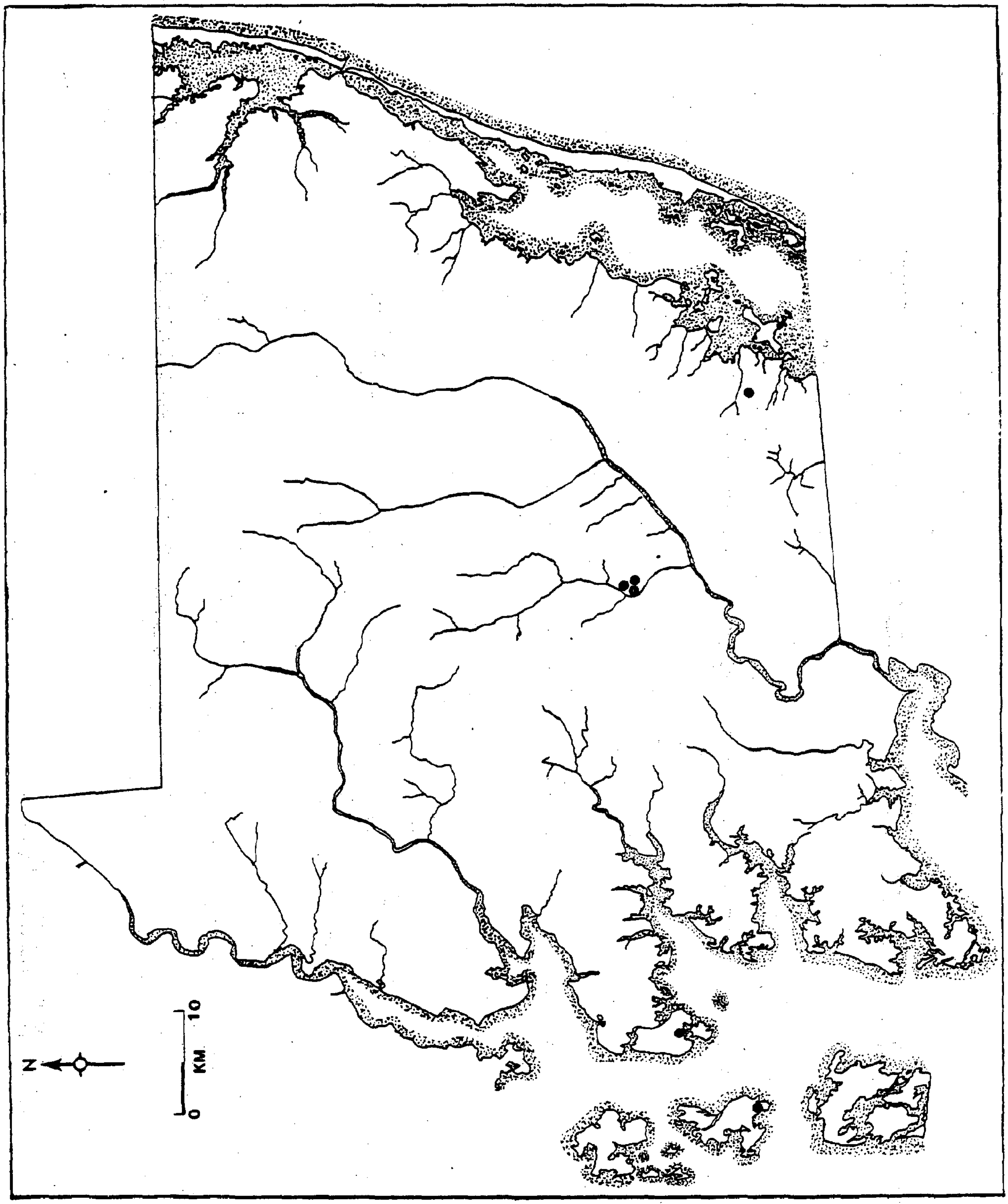


Figure 24 : EARLY ARCHAIC II

This tradition dates from approximately 6800 to 6000 B.C. and is widely distributed throughout the eastern United States.

The favored lithic raw material during this tradition remained the locally available cherts, presumably from exposed cobble sources (see Figures 25, 26 & 27), a single occurrence of an argillite St. Albans point indicates possible contact with other areas, but it is far from conclusive. Cresthull (1971) also indicates use of quartz and quarzite for bifurcated points at the Chance site, but again these are locally present in the cobble beds. This pattern of raw material use is different than that noted to the west by Steponaitis (1980:73) in the Patuxent drainage and Clark (1977:100) in the Gwynns Falls Valley. In both of those areas rhyolite was extensively used along with quartz, chert making up a much smaller percentage of used raw material.

Patterns of distribution (see Figures 28, 29 and 30) within the phases of the bifurcate tradition show some similarities with data from the Western Shore. The distribution of the three later phases are similar to that of the earlier Early Archaic II phase, just as noted for the Patuxent drainage (Steponaitis 1980:73). LeCroy points of the Early Archaic IV phase are likewise the most numerous within the study area with the St. Albans point being the second most common point type as noted by Steponaitis (ibid) for the opposite side of the Bay. Steponaitis (ibid) also notes a low recovery rate for Kanawha points and speculates that population density is the cause of this phenomenon. As the same low recovery is noted here, the probability is increased that factors in population density may be responsible. A shift away

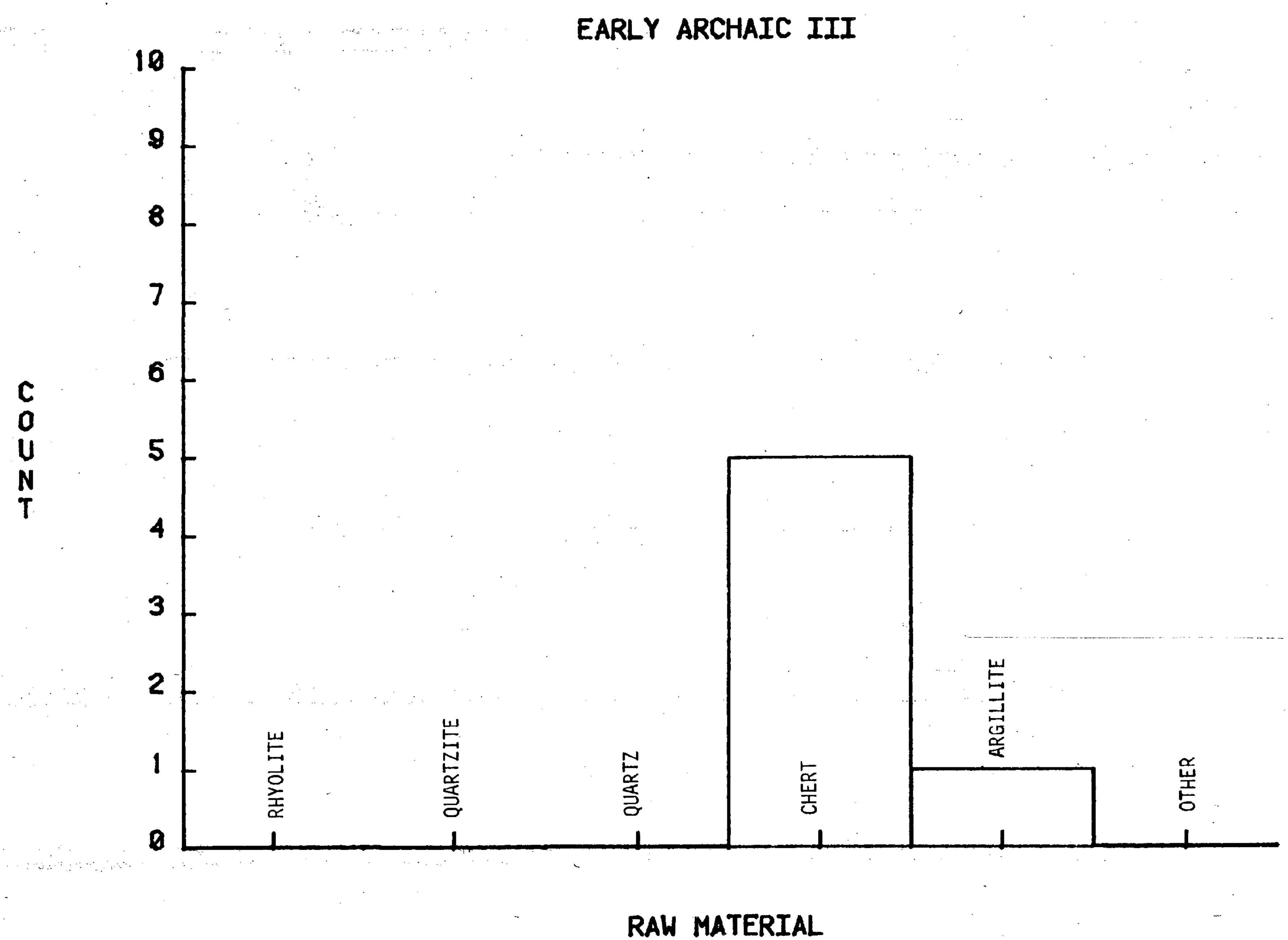

EARLY ARCHAIC III
COUNT
10
9
8
7
6
5
4
3
2
1
0
RHYOLITE
QUARTZITE
QUARTZ
CHERT
ARGILLITE
OTHER
RAW MATERIAL

FIGURE 25

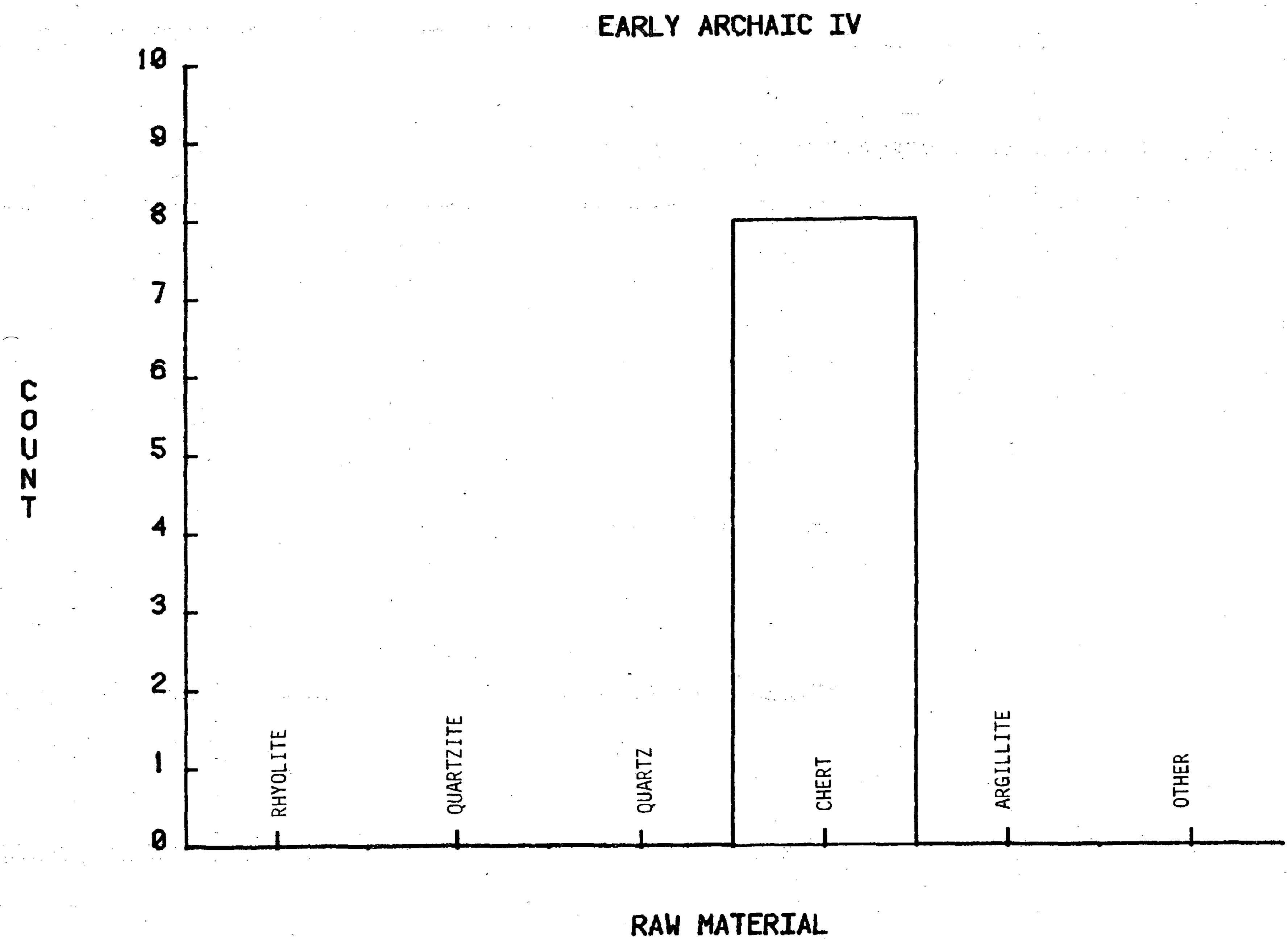

EARLY ARCHAIC IV
COUNT
10
9
8
7
6
5
4
3
2
1
0
RHYOLITE
QUARTZITE
QUARTZ
CHERT
ARGILLITE
OTHER
RAW MATERIAL

FIGURE 26

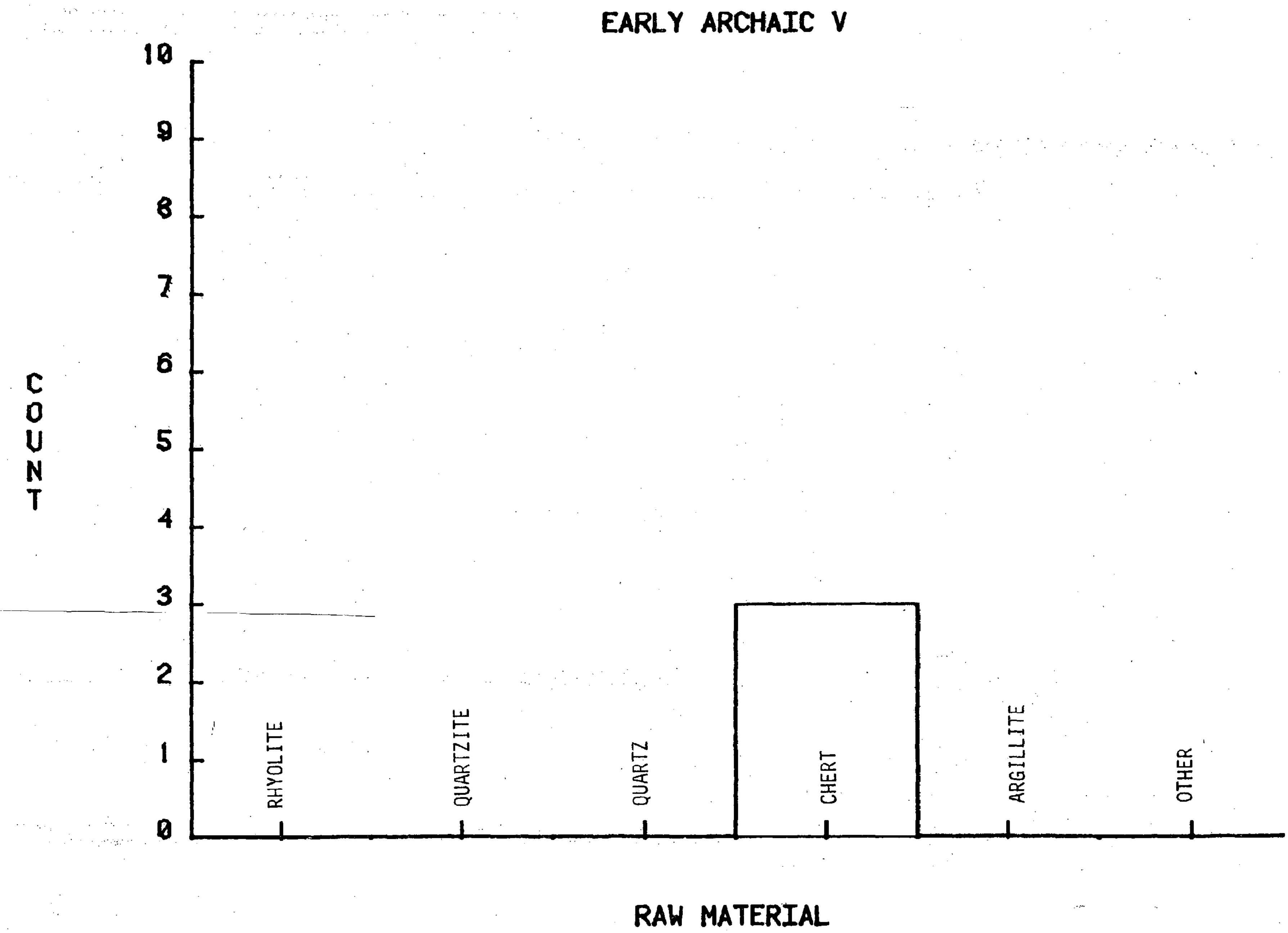

EARLY ARCHAIC V
COUNT
10
9
8
7
6
5
4
3
2
1
0
RHYOLITE
QUARTZITE
QUARTZ
CHERT
ARGILLITE
OTHER
RAW MATERIAL

FIGURE 27

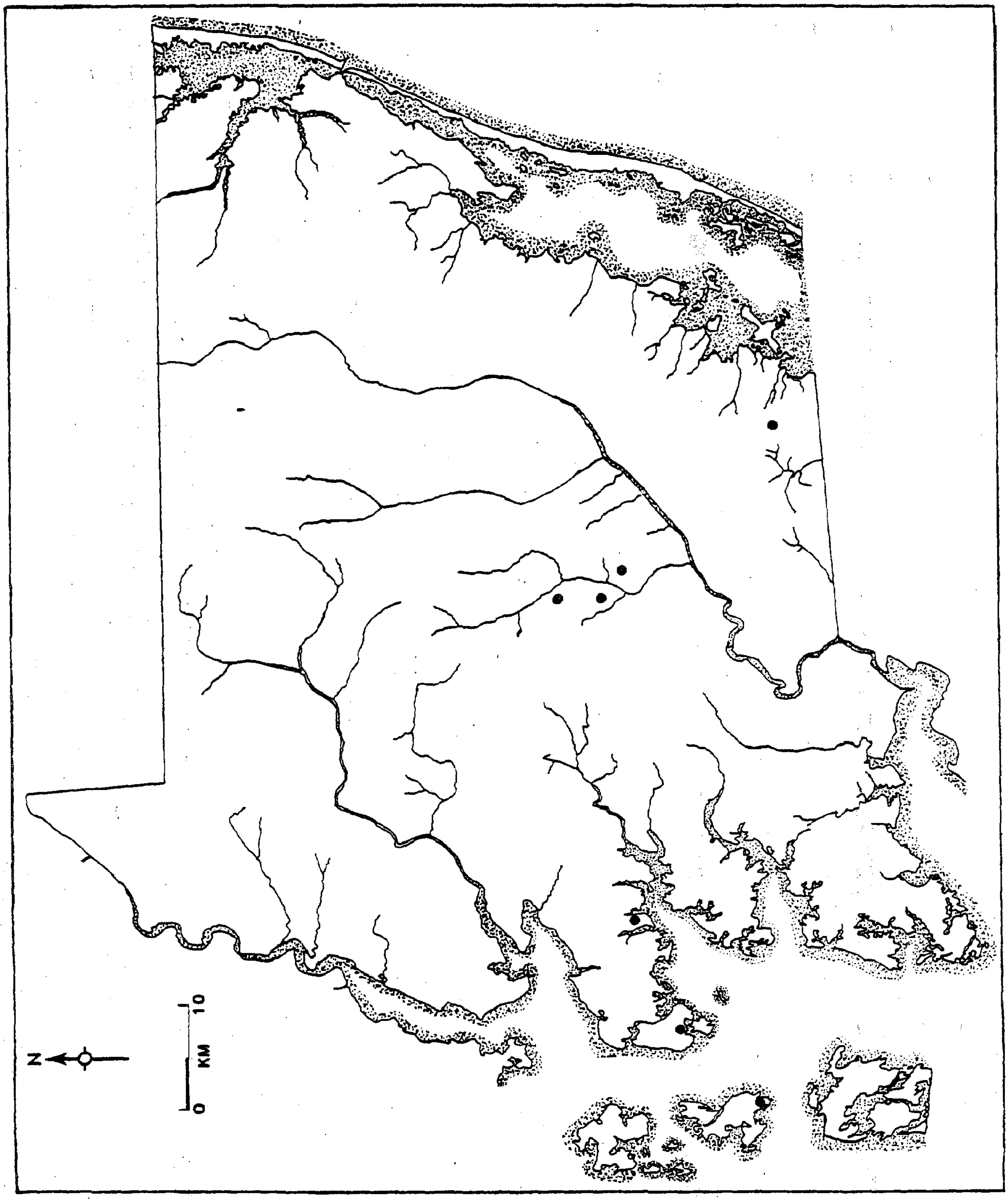


Figure 28 : EARLY ARCHAIC III

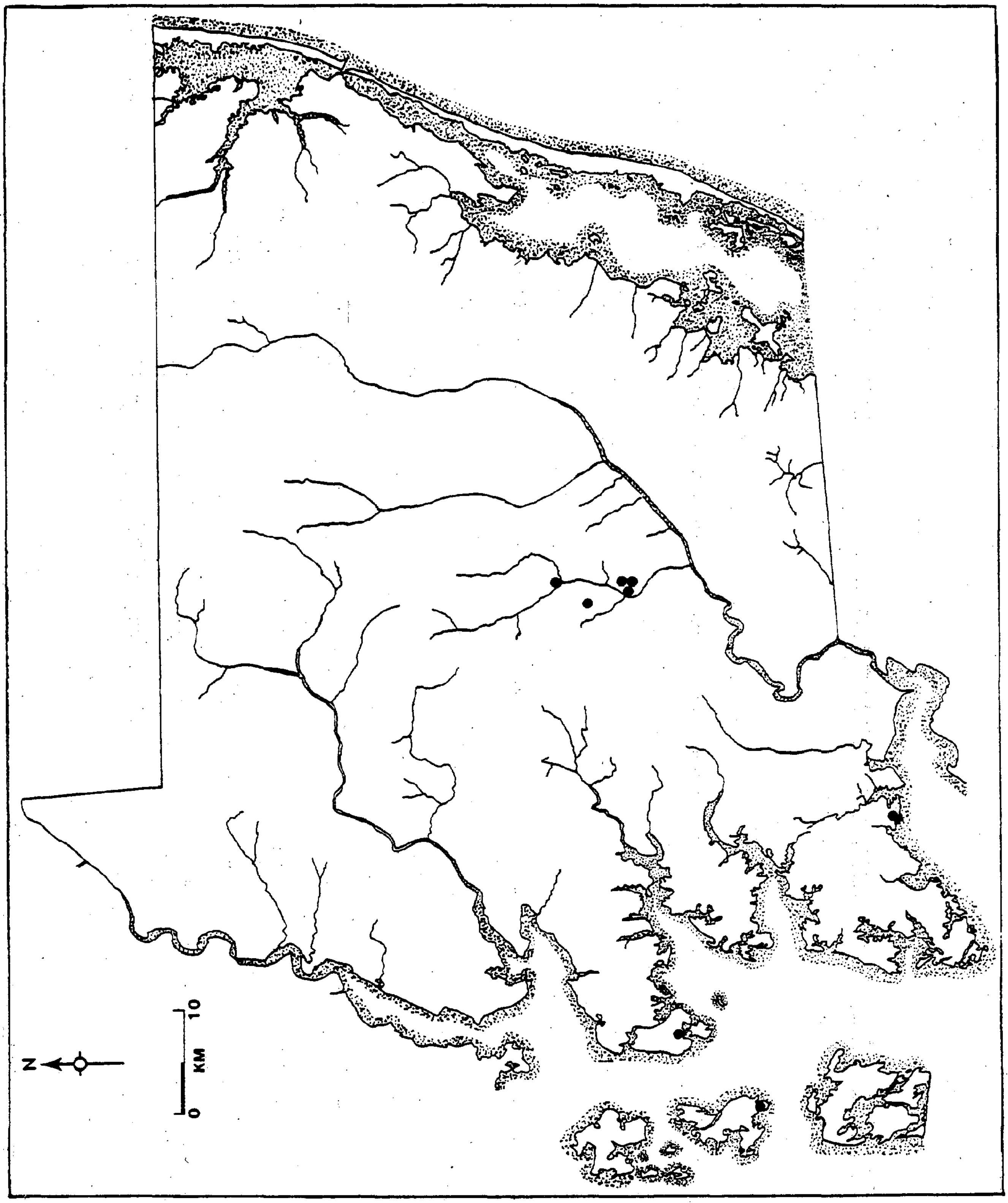


Figure 29 : EARLY ARCHAIC IV

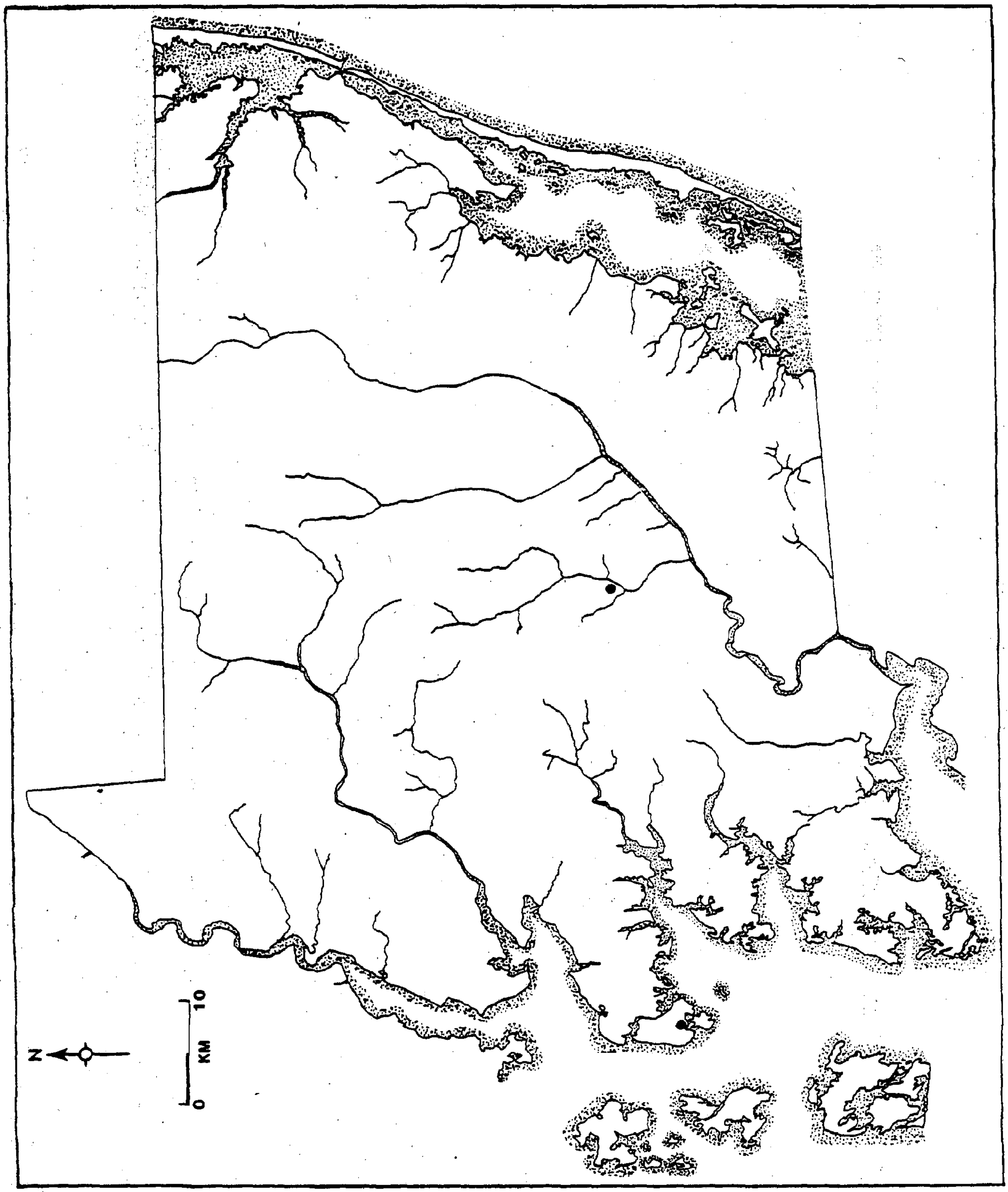


Figure 30 : EARLY ARCHAIC V

from the Atlantic coastal drainage area occurs in the study area during the late Early Archaic IV and V phases, but sites along the Bay-side of the peninsula and in inland drainage areas still persist. This spread of sites in all areas, from Atlantic to inland to Bay, would seem to agree with the commonly accepted view of the late Early Archaic subsistence strategy revolving around the scheduled use of seasonally available resources (Gardner 1978). This subsistence strategy appears to have arisen early on the Coastal Plain as noted for the earlier phases and also speculated for the Western Shore by Steponaitis (1980:73).

MIDDLE ARCHAIC

The Middle Archaic Period (6000 to 4000 B.C.) saw a shift in the environment from the cool, dry period of the Boreal episode to the warm wet period of the early Atlantic episode (ca. 4500 B.C.) This climatic change caused a final shift from the northern hardwood type of forest to the type of forest present today on the middle Delmarva Peninsula where oaks and pines predominate in all areas except the poorly-drained river swamps. Inundation of the Atlantic and Bay shorelines continued along with increased flooding of river drainage areas. This flooding of rivers may have given rise to exploitable estuarine resources, but as the mouths of the rivers as they existed during the Middle Archaic would now be under water, no evidence exists to support this contention. Much speculation has occurred as to whether swamps arose along inland portions of rivers at this time (Gardner 1978). This is not clear for the study area at this time. Swamps may have been present in the Early

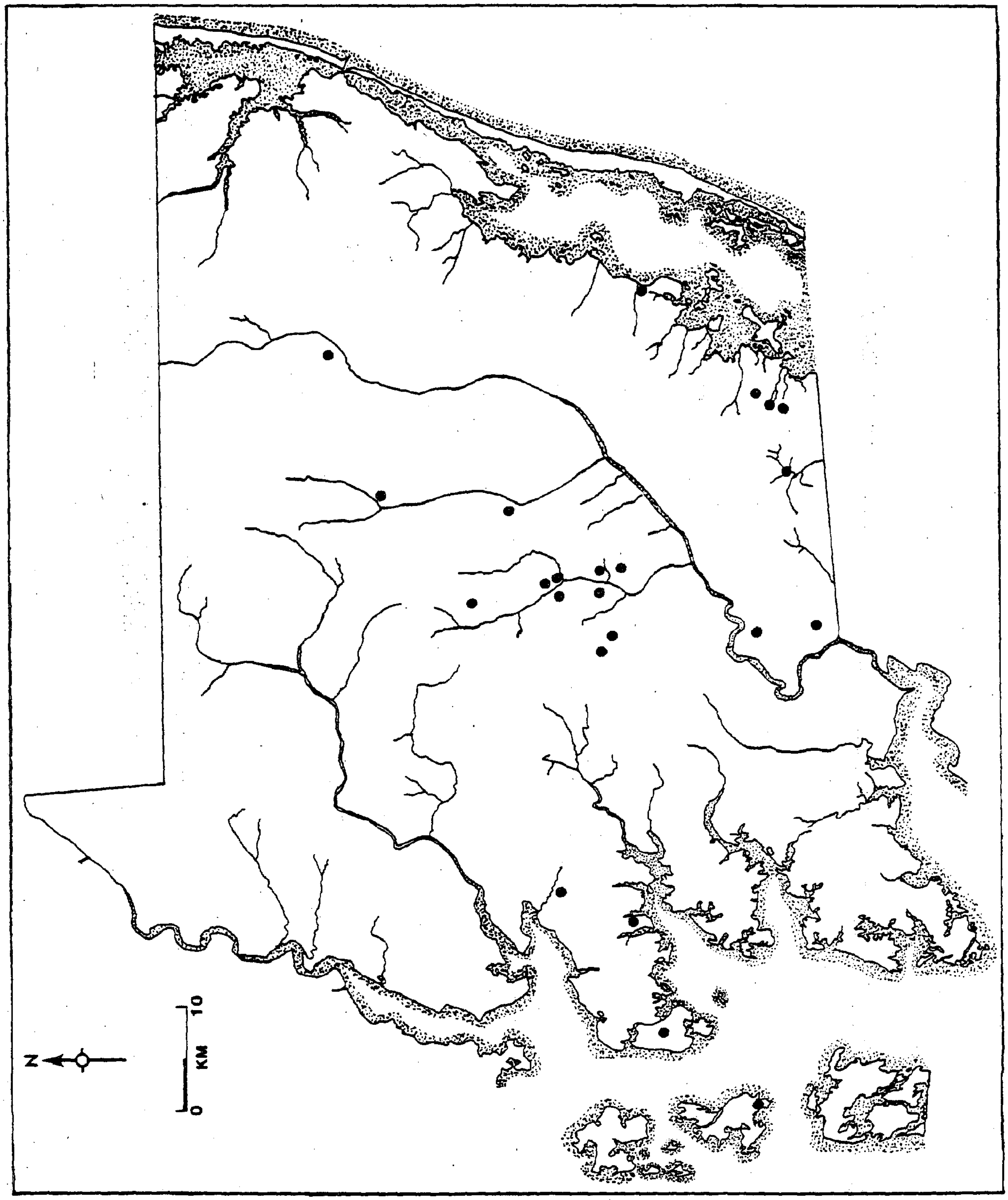


Figure 31 : MIDDLE ARCHAIC - TOTAL SITES

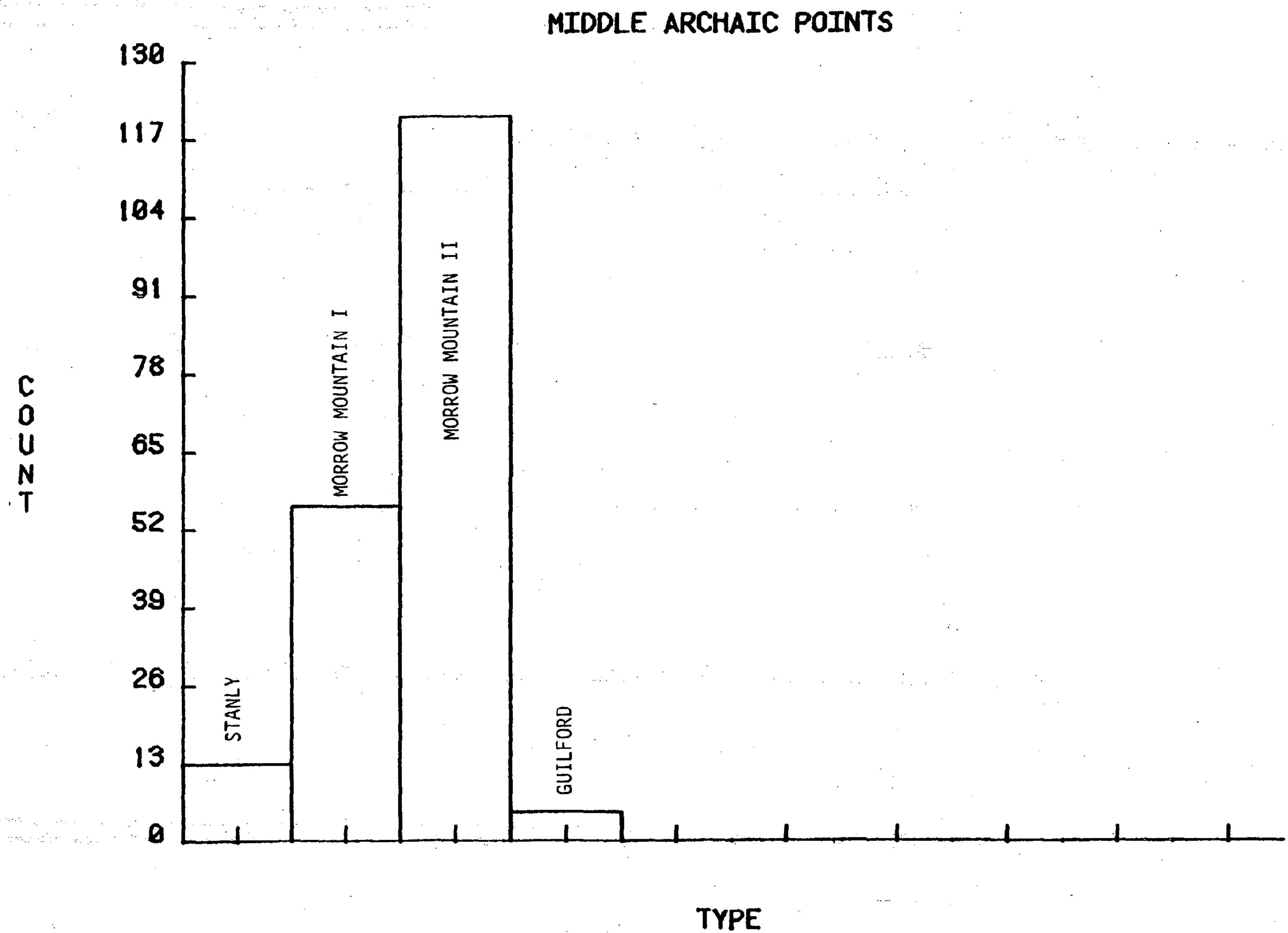

MIDDLE ARCHAIC POINTS
130
117
104
91
78
65
52
39
26
13
0
COUNT
STANLY
MORROW MOUNTAIN I
MORROW MOUNTAIN II
GUILFORD
TYPE

FIGURE 32

Archaic and little real change in site location is noted. Some good dates from swamp area cores would go a long way towards clarifying this problem.

Middle Archaic I:

This phase, distinguished by the Stanly projectile point, is relatively poorly represented within the study area although it does occur in moderate numbers unlike its total absence in the Patuxent drainage (Steponaitis 1980:75). A minimal representation of this point throughout the Northeast has been noted by Kinsey (1972), Ritchie (1969) and others. This was thought to be the result of depopulation due to the low productivity of the closed boreal forest, but this view has been challenged. A point very similar to the Stanly has been reported from New Hampshire (Dincauze 1976) associated with a tool kit very similar to that excavated by Coe (1964) at the Doershuck Site. This evidence makes it likely that a failure to recognize the Stanly point among similar earlier and later forms may be responsible for its seeming scarcity. Certainly no dramatic environmental changes are noted within the study area at this time (6000-5000 B.C.). One very interesting occurrence noted within the study area at this time is a clear rise in the use of non-local materials (see figure 33). Rhyolite and argillite represent 40% of the utilized raw material which is a clear increase in the use of non-local materials although locally available cherts and quartzite are still the predominantly used materials. This evidence of contact with outside areas would appear to agree with the previously

MIDDLE ARCHAIC I

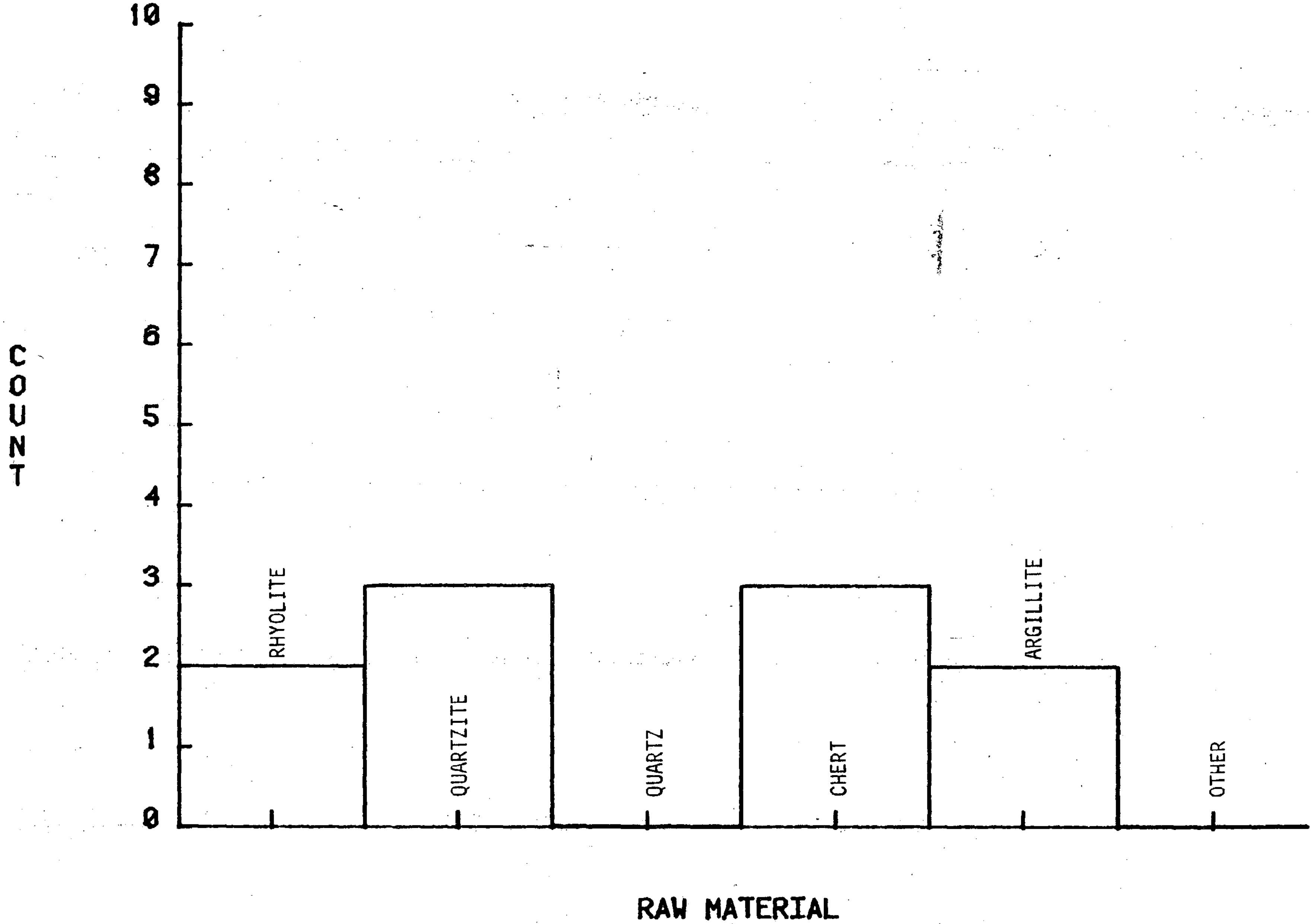


FIGURE 33

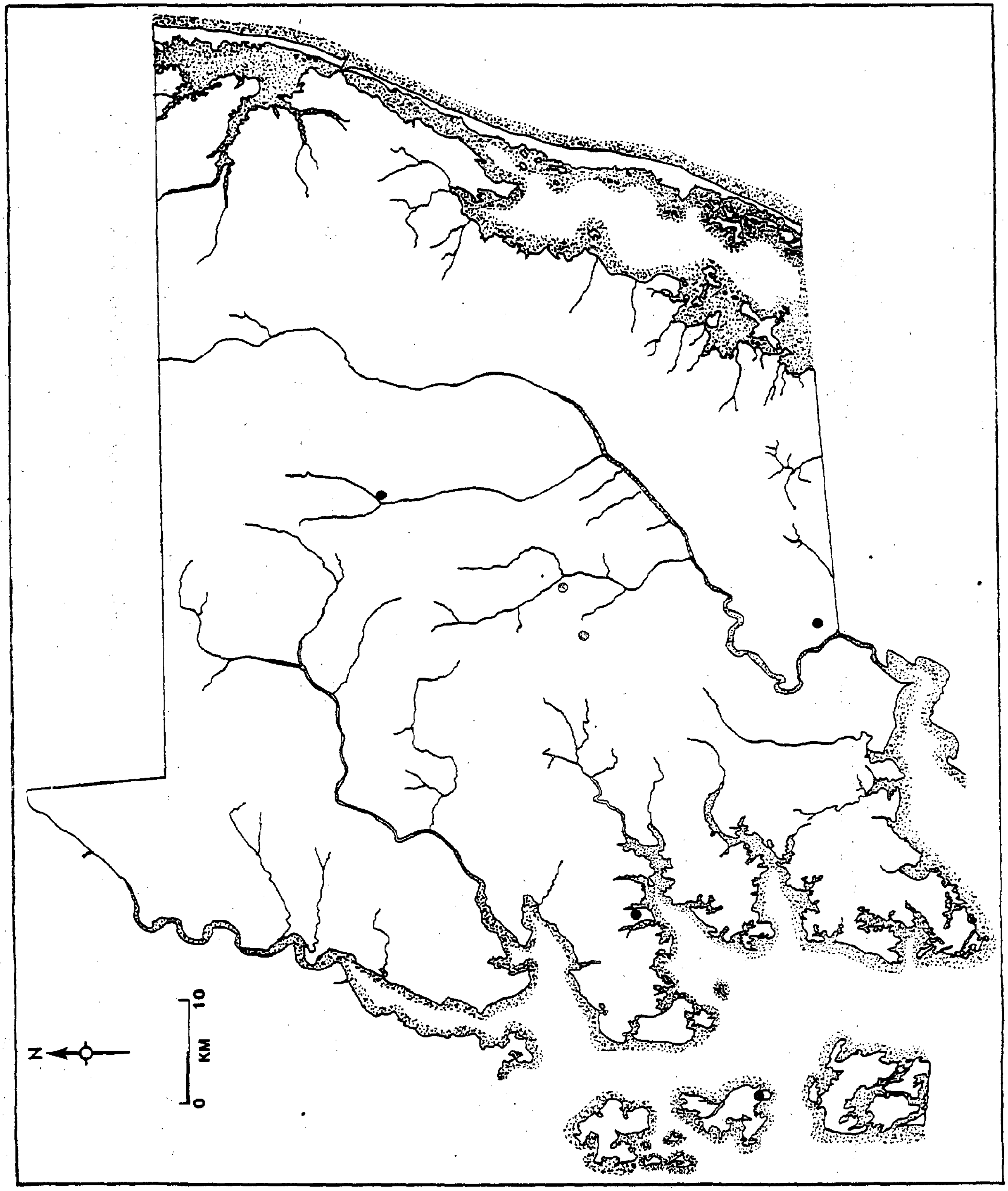


Figure 34 : MIDDLE ARCHAIC I

noted appearance of an extensive Stanly-Neville cultural tradition running from the Southeast to the Northeast. Coe (1964) also notes the appearance of ground stone tools at this time.

A continued lack of sites in the Atlantic drainage area as noted in the preceding Early Archaic V phase is seen, but this may simply reflect the inundations of any sites in this area due to sea level rise. See Figure 34.

Middle Archaic II:

The Middle Archaic II phase (5000-4200 B.C.) is distinguished by Morrow Mountain I and Morrow Mountain II projectile points. These two classes of points taken together are by far the most numerous point types within the study area, particularly Morrow Mountain II type. A continued use of non-local materials is noted (see Figure 35), but use of locally available quartzite predominates, being used 40% of the time. Coe (1964) notes a particular concentration of Morrow Mountain II points in the Middle Atlantic region as a whole and this area agrees well with such a picture. Similar points are known from New Hampshire (Dincauze 1976) to North Carolina (Coe: 1964) indicating a continuation of a shared cultural pattern as in the previous phase. Ground stone tools include atlatl weights and fully-grooved axes at this time (Dincauze 1976:121). Cresthull (1972) notes similar groundstone weights from the Eastern Shore during this phase, but poor provenience on these artifacts make their dating unclear.

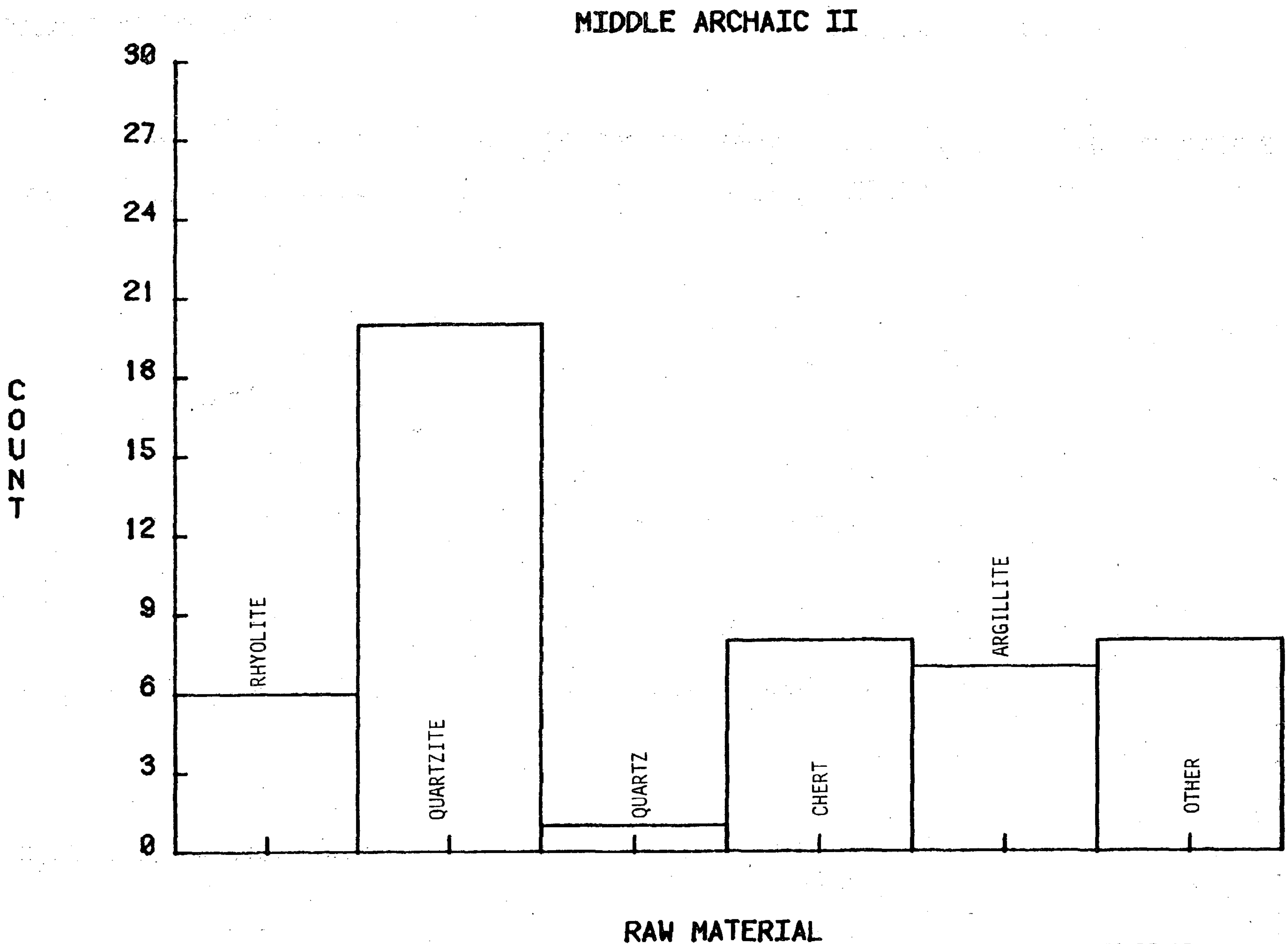

MIDDLE ARCHAIC II
COUNT
30
27
24
21
18
15
12
9
6
3
0
RHYOLITE
QUARTZITE
QUARTZ
CHERT
ARGILLITE
OTHER
RAW MATERIAL

FIGURE 35

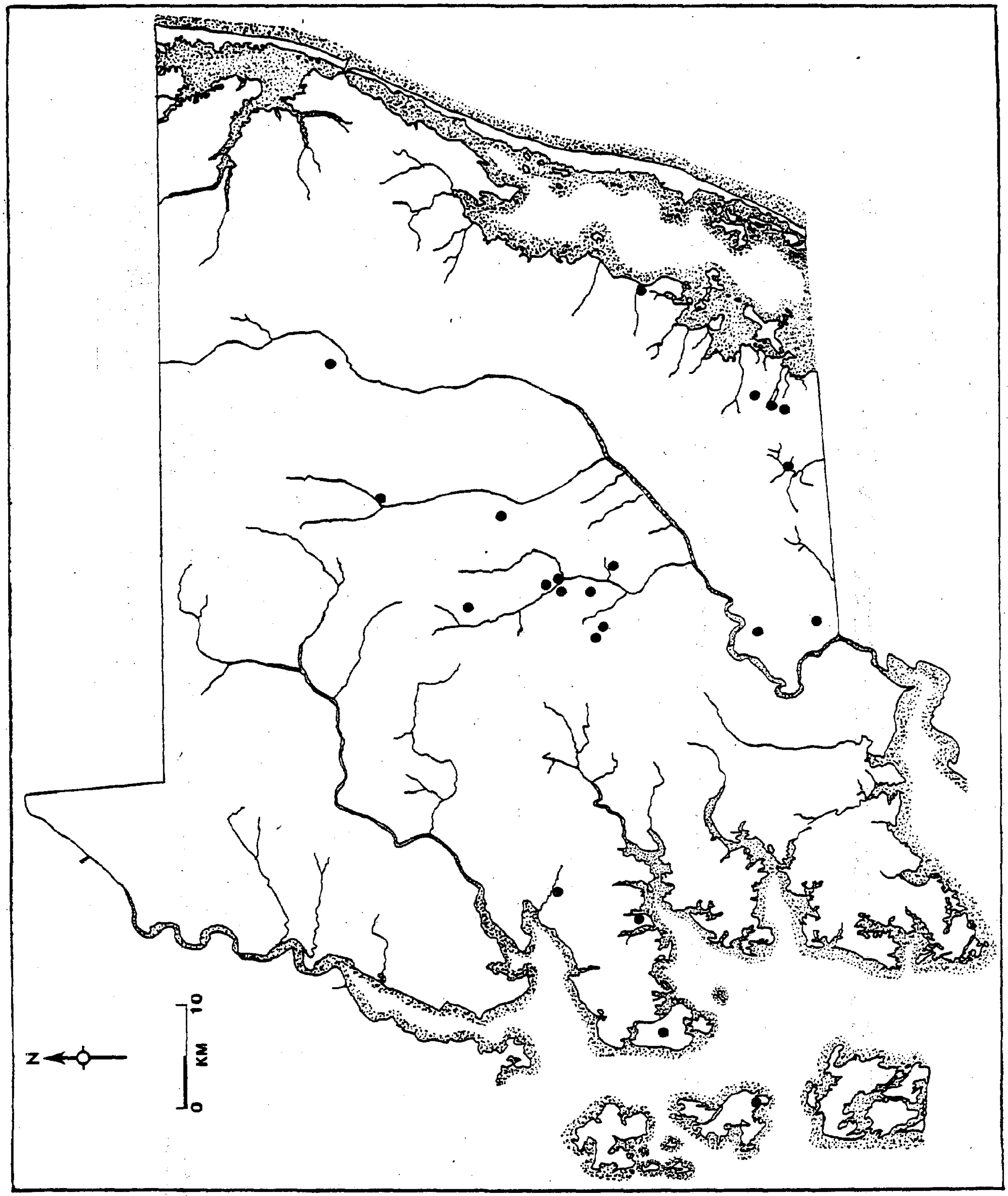


Figure 36 : MIDDLE ARCHAIC II

A clear rise in the number of sites during this period may indicate an increase in population, although any statement of this sort based upon non-systematically collected data is pure speculation at best. Gardner (1978) postulates a major focus on inland swamps with transitory camps on second and third order streams. Dincauze (1976) suggests exploitation of andromous fish at the Neville site, but whether this was occurring here is unknown. Sites within the study area are again located in all areas, from the Atlantic across to the Bay islands. They do seem to be associated with swamp areas, such as along the lower Pocomoke River, as well as with what were probably lower order streams along the Atlantic drainage area. See Figure 36. This exploitation of all environmental zones probably indicates a generalized foraging economy during this phase.

Middle Archaic III:

The Guilford Lanceolate point marks this final phase in the Middle Archaic period. The number of Guilford points in the study area decreases dramatically compared to the previous Morrow Mountain I and II types. This is the opposite of the trend noted on the Western Shore by Steponaitis (1980:77). Coe (1964:123) notes that Guilford phase material is rare to the north and east of the Piedmont. This appears to agree with data from the study area.

Lithic preferences during this phase see a continued presence of non-local materials (33.3%) but a continued reliance on local cherts and quartzite predominates (see Figure 37).

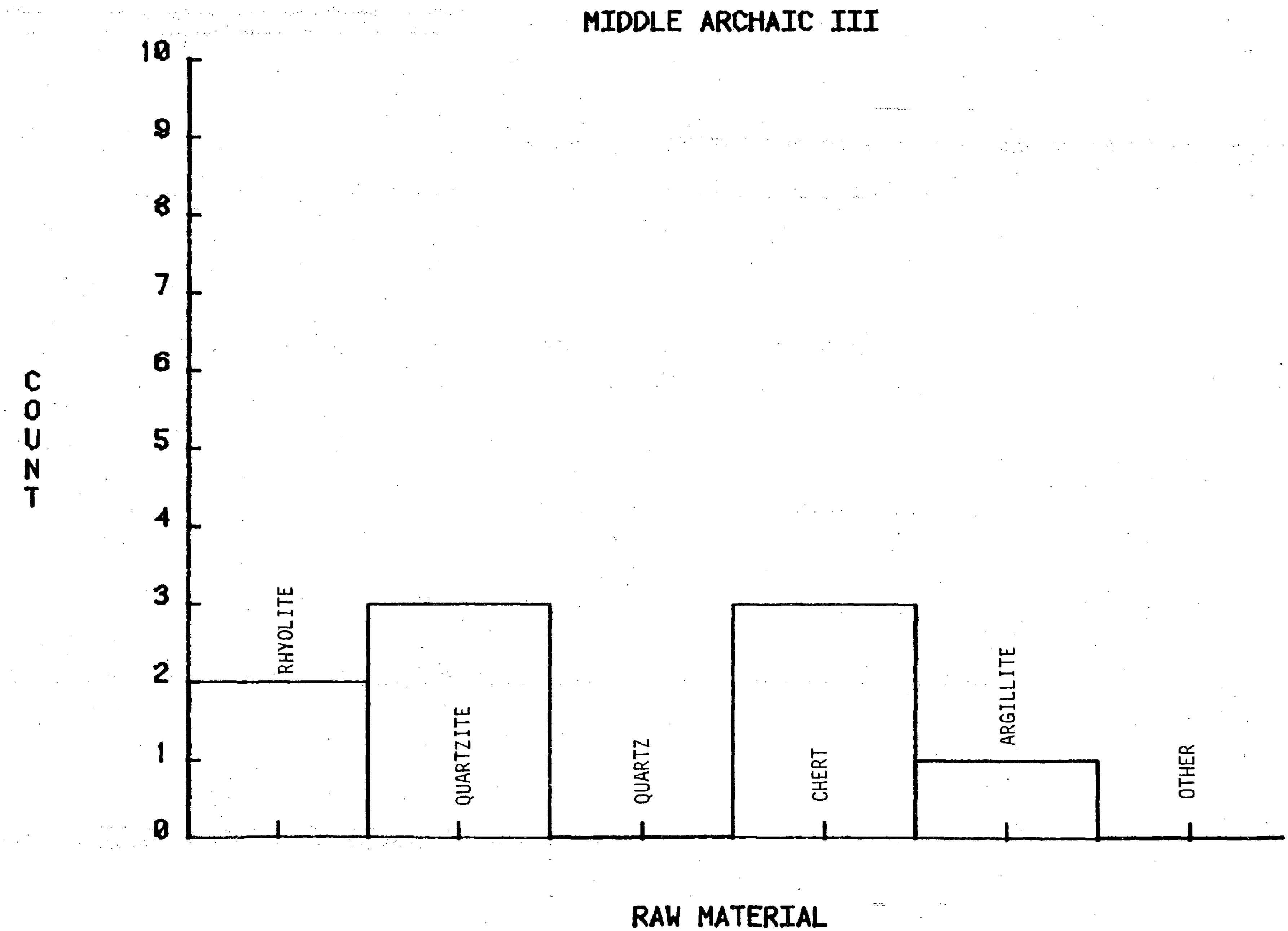

MIDDLE ARCHAIC III
COUNT
10
9
8
7
6
5
4
3
2
1
0
RHYOLITE
QUARTZITE
QUARTZ
CHERT
ARGILLITE
OTHER
RAW MATERIAL

FIGURE 37

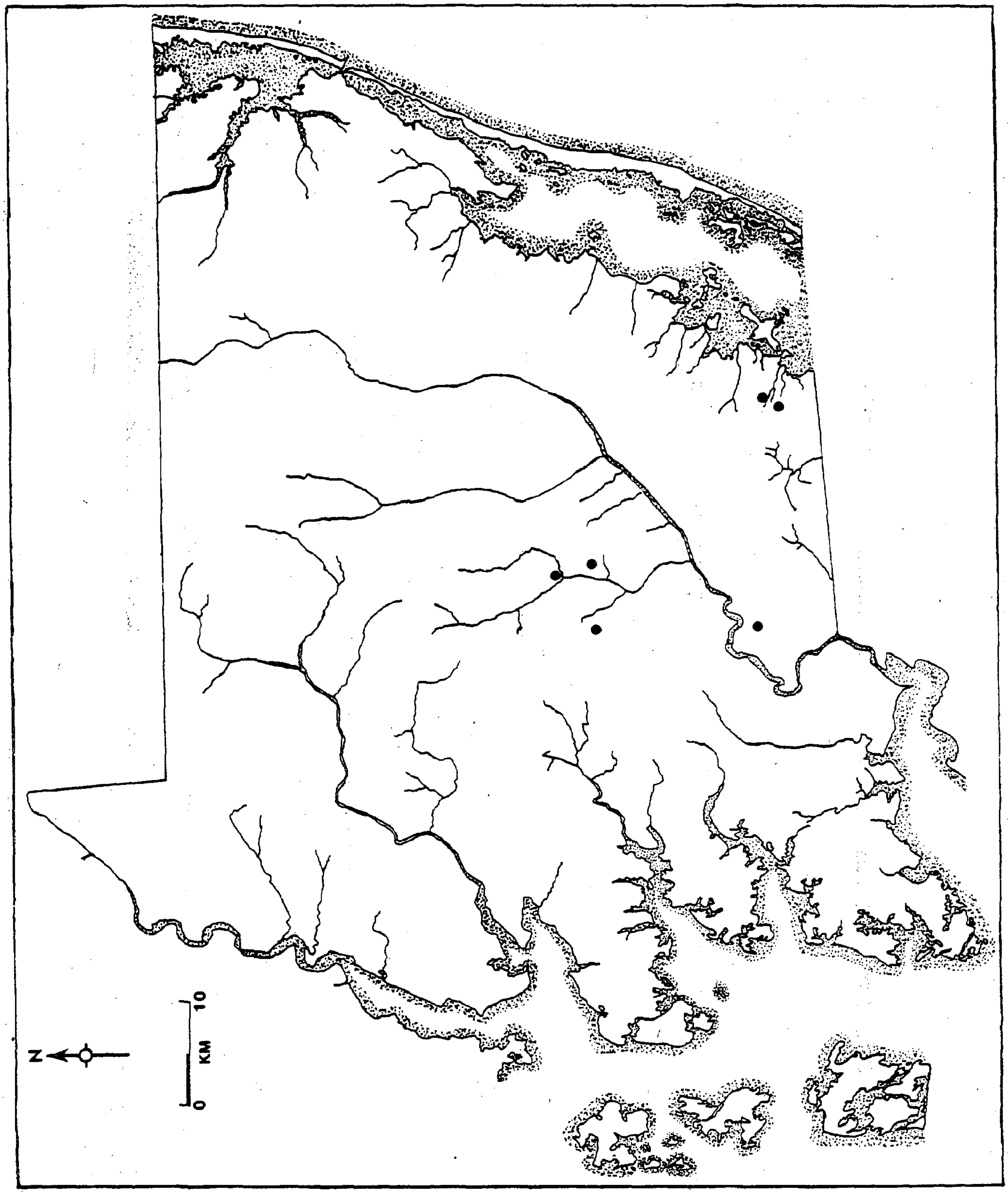


Figure 38 : MIDDLE ARCHAIC III

The number of Middle Archaic III phase sites also decreases from the previous phase, with a lack of Bay-side sites being noted. The explanation for this absence is unclear, but an emphasis on lower order streams and swamps seems to be indicated. See Figure 38.

LATE ARCHAIC PERIOD

The climate of the Late Archaic Period (4000-1200 B.C.) was warm and dry with the period around 2300 B.C. having the highest mean temperatures. Vegetation in the study area was similar to today, being an oak-pine forest with areas of swamp and marsh vegetation. Sea level rise continued to inundate the shorelines of the Atlantic and Chesapeake Bay drainages until sea level stood at approximately seven meters below current level on the Atlantic side and eleven meters lower on the slightly slower rising Chesapeake Bay side of the peninsula by around 3000 B.C. The estuarine zones of river drainages would be extensive by this time, providing oysters and other food resources. Anadromous fish were also present by this phase and would have been seasonally available.

It appears that two traditions were present during the early part of the Late Archaic period. In Delaware, work by Thomas (1976) led him to see "two partially contemporaneous" traditions present; the Piedmont Tradition with affinities to the south and east, and the Laurentian Tradition with connections to areas north of the Delmarva Peninsula. The exact tradition to which each point type of the early Late Archaic belongs is not always clear.

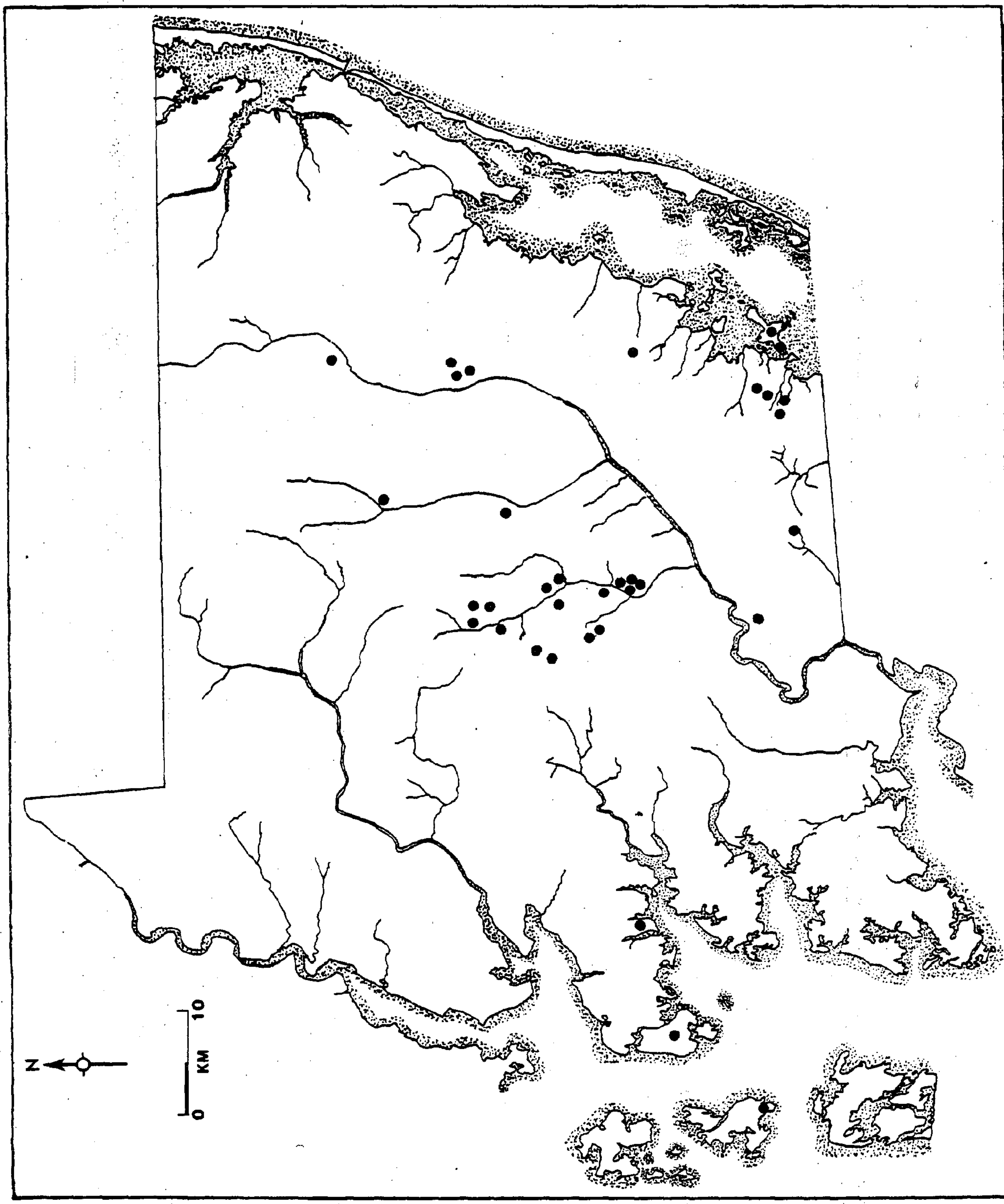


Figure 39 : LATE ARCHAIC - TOTAL SITES

Points associated with the Piedmont tradition seem to have developed out of the same complex represented by Morrow Mountain and Guilford points (Kinsey 1972, McNett and Gardner 1975). Local raw materials predominate and the projectile points tend to be long and narrow. The most likely projectile points to be associated with this tradition are the Piscataway, Vernon, Lamoka and Holmes.

The Laurentian Tradition was defined by Ritchie (1969) based on material from the upper St. Lawrence drainage. His total definition does not have wide applicability, but the Brewerton and Otter Creek points he describes are found widely in the eastern United States.

Within the study area, both traditions seem to be moderately well represented. The Piedmont tradition Piscataway point is the most numerours single point type of the Late Archaic but all types of Brewerton points are even more numerous when taken as a whole. Conversely, Otter Creek points are relatively rare within the study area, possibly arguing against a strong Laurentian influence. Site distribution during the early Late Archaic shows no real variation between phases indicating the exploitation of similar environments by all human groups in the area. Interregional exchange between the two traditions, as suggested by Steponaitis (1980:82), also seems a possible explanation for the presence of artifacts from both traditions. Projectile points belonging to both traditions occur at the same site suggesting either the same people were using the two different tradition points, or the same sites were used by both groups of people, presumably at slightly different times. The fact that all material comes from surface collections makes any

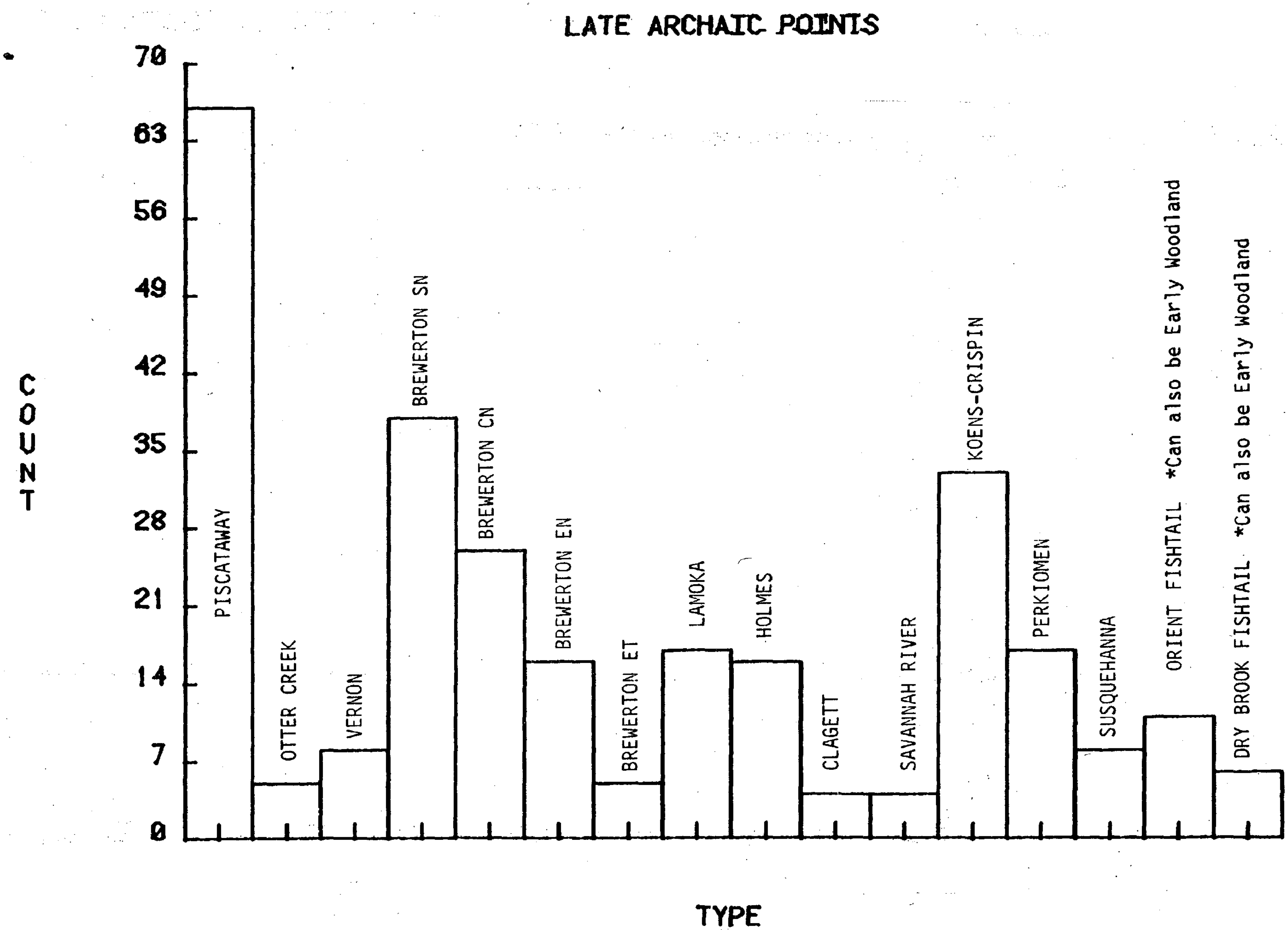

LATE ARCHAIC POINTS
COUNT
70
63
56
49
42
35
28
21
14
7
0
PISCATAWAY
OTTER CREEK
VERNON
BREWERTON SN
BREWERTON CN
BREWERTON EN
BREWERTON ET
LAMOKA
HOLMES
CLAGETT
SAVANNAH RIVER
KOENS-CRISPIN
PERKIOMEN
SUSQUEHANNA
ORIENT FISHTAIL *Can also be Early Woodland
DRY BROOK FISHTAIL *Can also be Early Woodland
TYPE

FIGURE 40

possible temporal distinctions between the two traditions hard to determine and a true answer to what the relation between these two traditions is on the Eastern Shore must await further work.

During the later part of the Late Archaic Period (here covering Late Archaic phases IV, V and VI) two other traditions are noted in the study area. These two traditions, the Broadspear Tradition and the Fishtail Tradition, do not occur simultaneously as with the traditions noted in the early Late Archaic Period. The Broadspear Tradition apparently developed out of the earlier Piedmont Tradition and the Fishtail Tradition in turn appears to develop from the Broadspear Tradition. Both of these traditions will be discussed in fuller detail later.

Late Archaic I:

The first phase of the Late Archaic (4000-3000 B.C.) is marked by the Piedmont tradition Piscataway point. The point has morphological similarity to the earlier Guilford point and may have developed from the Guilford-Morrow Mountain complex. Stephenson (1963) defined the Piscataway point and noted that it was predominantly made from quartz and quartzite. This choice of raw material is not followed within the study area where the majority of Piscataway points are made from local cherts (47%) with quartz and quartzite being the secondary choices (23.5% and 16% respectively) and argillite or rhyollite occuring for 13% of noted examples (see Figure 41). As in the Middle Woodland period, an increased diversity of raw materials is noted, but a clear preference

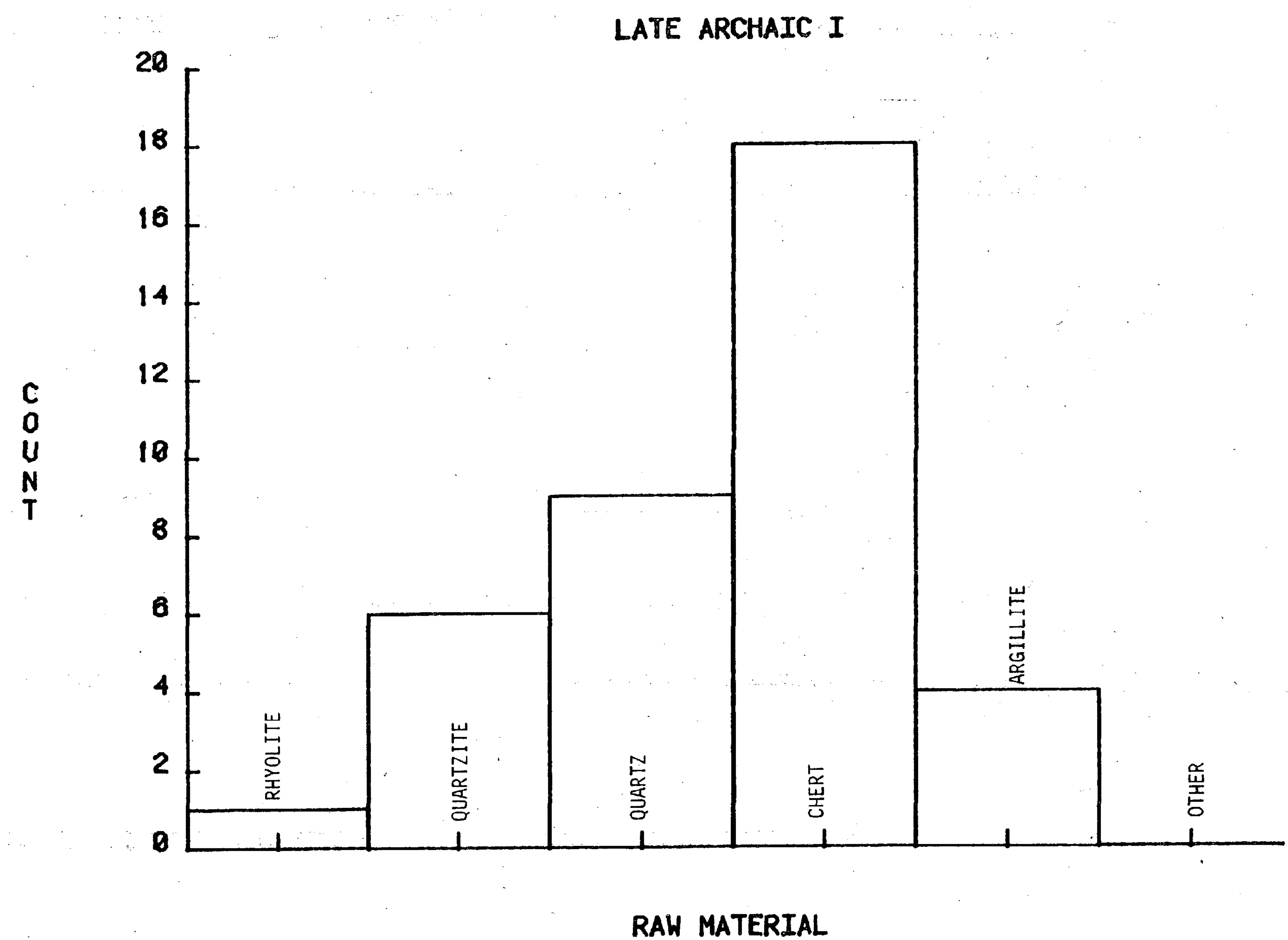

LATE ARCHAIC I
COUNT
20
18
16
14
12
10
8
6
4
2
0
RHYOLITE
QUARTZITE
QUARTZ
CHERT
ARGILLITE
OTHER
RAW MATERIAL

FIGURE 41

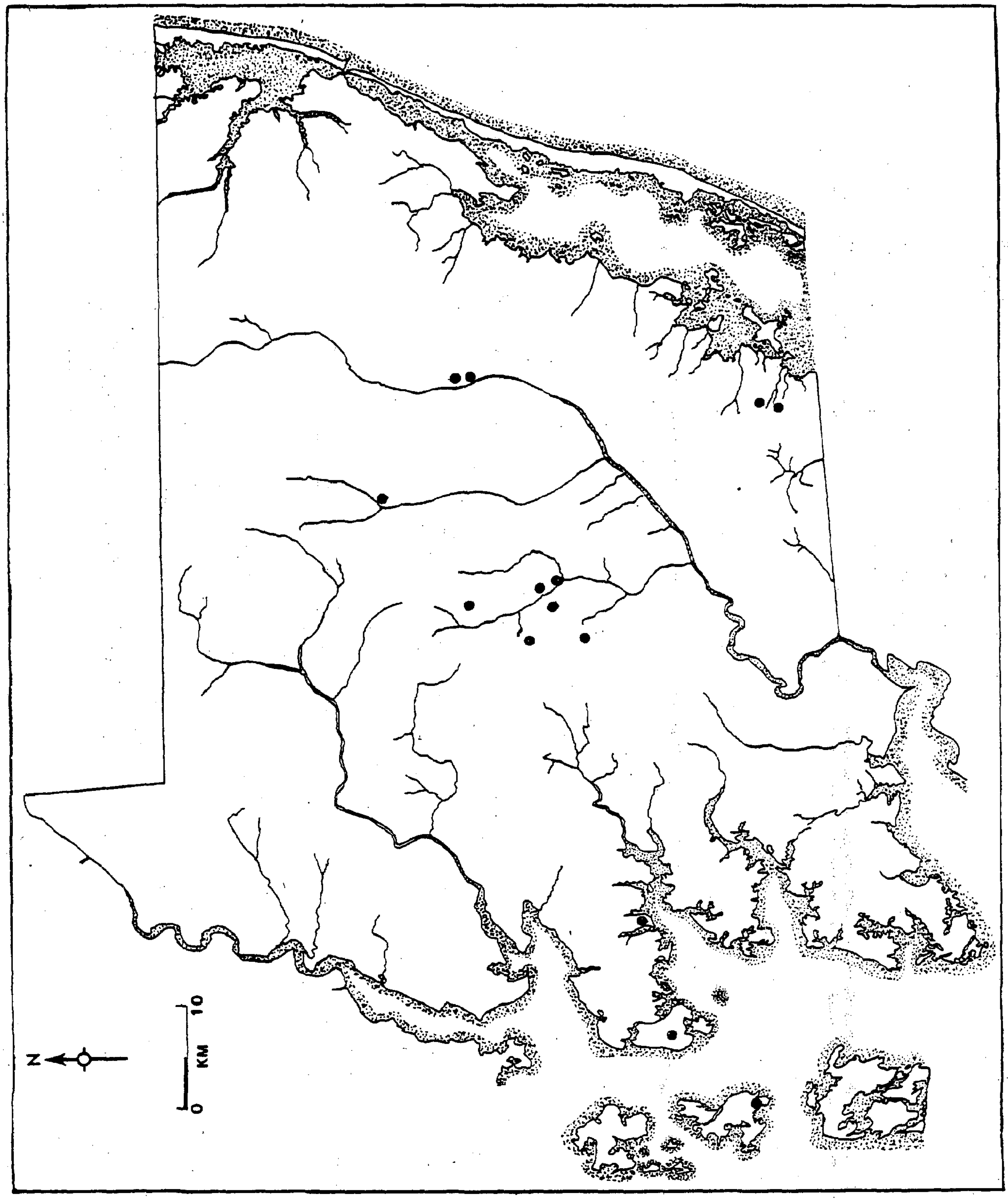


Figure 42 : LATE ARCHAIC I

for the use of local cobble materials remains evident.

The distribution of Late Archaic I sites (see Figure 42) shows an increase in the number of sites from the Middle Archaic III phase as well as a renewed presence on the Bay side of the peninsula. Sites are again noted in a diverse variety of environmental zones, from the Atlantic drainage area adjacent to low order streams, inland along swamps, creeks and rivers, and along the Chesapeake Bay drainage areas. The site locations noted in the study area agree well with data from Delaware where sites of the early Late Archaic are noted to be scattered throughout the state in many micro-environments, most commonly in areas of high hunting potential (Thomas 1974). It would seem, based on site density, that upland portions of streams and inland swamp areas were the main focus during this period with a secondary emphasis on the larger river drainage and coastal areas. Central base camps may have been near the inland swamp areas such as Dividing Creek with seasonal camps near the shore areas. The beginnings of the later riverine emphasis may thus be present this early in the Late Archaic.

Late Archaic II:

The Late Archaic II phase (3000-2200 B.C.) is distinguished by the Laurentian tradition Brewerton Side-Notched, Corner-Notched, Ear-Notched and Eared-Triangle points; the Lamoka point which Ritchie (1961) defined in New York; and the Vernon Side-Notched point which is likely associated with the Piedmont tradition.

The raw material used during this phase (see Figure 43) shows certain differences from the Late Archaic I phase, particularly the use of quartz and quartzite which declines. Chert is still the main raw material used (51%), with all Vernon points being fashioned from this material. The use of quartz and quartzite declines from a 39.5% total in the preceeding phase to only 12.5% during the Late Archaic II. This decline is matched by a rise in the use of rhyollite and argillite from 13% to 27.5%. This increase in the use of non-local rhyollite and argillite may be a reflection of the strong Laurentian influences which seem to be at work during this phase as reflected by the high number of Brewerton-type points seen in collections. Unlike the Western Shore where Steponaitis(1980:83) notes fewer Brewerton than Vernon points, the former type far outnumber the Vernon points on the lower Eastern Shore of Maryland. Steponaitis (ibid) also notes that Brewerton points are often manufactured from "nonlocal" cherts in the Patuxent drainage. This raises the question of how one determines what is a local lithic material and what is a non-local lithic material? In an area such as Maryland's lower Eastern Shore, very little is known about the lithic materials present. All deposits are not known (as shown by the number of sources found during this study which were unknown to geologists the author spoke with) and what these deposits contain is an even bigger question mark. For example, samples of chert nodules collected from a cobble deposit west of Princess Anne in Somerset County showed an amazing variety of colors and textures with color ranging from red to light brown to black. As these cobble deposits were transported here by Pleistocene and post-Pleistocene events, virtually any area to the North could

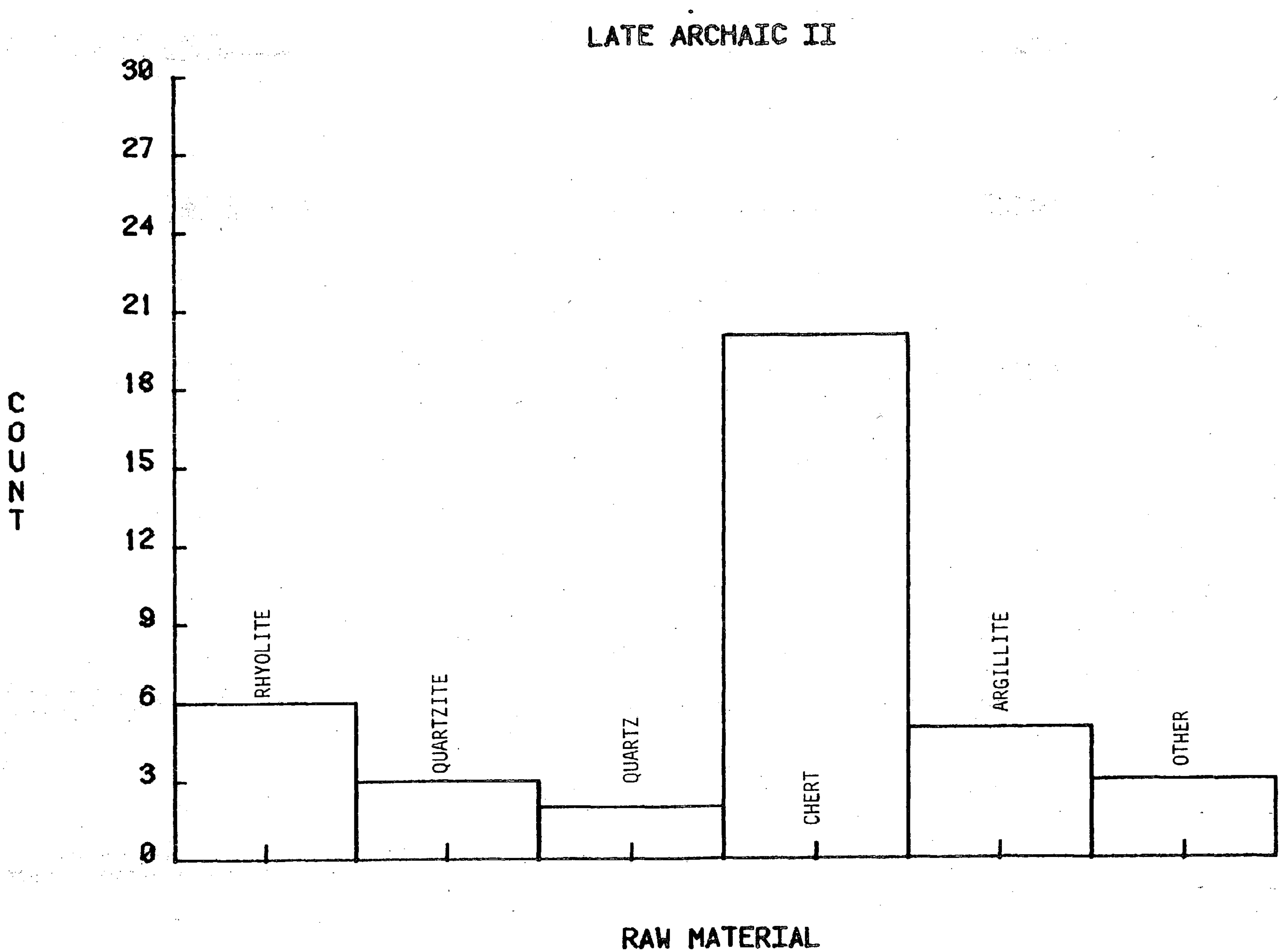

LATE ARCHAIC II
COUNT
30
27
24
21
18
15
12
9
6
3
0
RHYOLITE
QUARTZITE
QUARTZ
CHERT
ARGILLITE
OTHER
RAW MATERIAL

FIGURE 43

have provided raw materials for transport to the lower Eastern Shore. This makes determinations of local versus non-local nature very tricky indeed and only the presence of argillite or rhyollite artifacts can be seen to indicate non-local raw material origin with any degree of confidence. Perhaps even these materials may be found to be present in the cobble deposits upon further study.

The distribution of Late Archaic II phase sites (see Figure 44) is very similar to the preceeding phase with sites favoring inland swamp and lower order stream locations on well-drained ridges. The overall number of artifacts and sites show a slight increase over the preceeding phase, an occurrence which is unlike the Patuxent drainage where a decrease is noted (Steponaitis 1980:85). The reasons for this are unclear.

The subsistence-settlement pattern of this phase probably involved continued seasonal exploitation of multiple environments. Wilke and Thompson (1977) noted a series of Late Archaic sites in Kent County on the upper Eastern Shore which represented the exploitation of both coastal and inland environments. This same subsistence strategy was likely followed on the lower Eastern Shore. Wilke and Thompson (ibid) also indicate that shellfish gathering was occurring by this time period in Kent County.

Late Archaic III:

The marker of this phase is the Holmes point with dates from 2200-1900 B.C. being the likely time span. The Holmes point is probably a

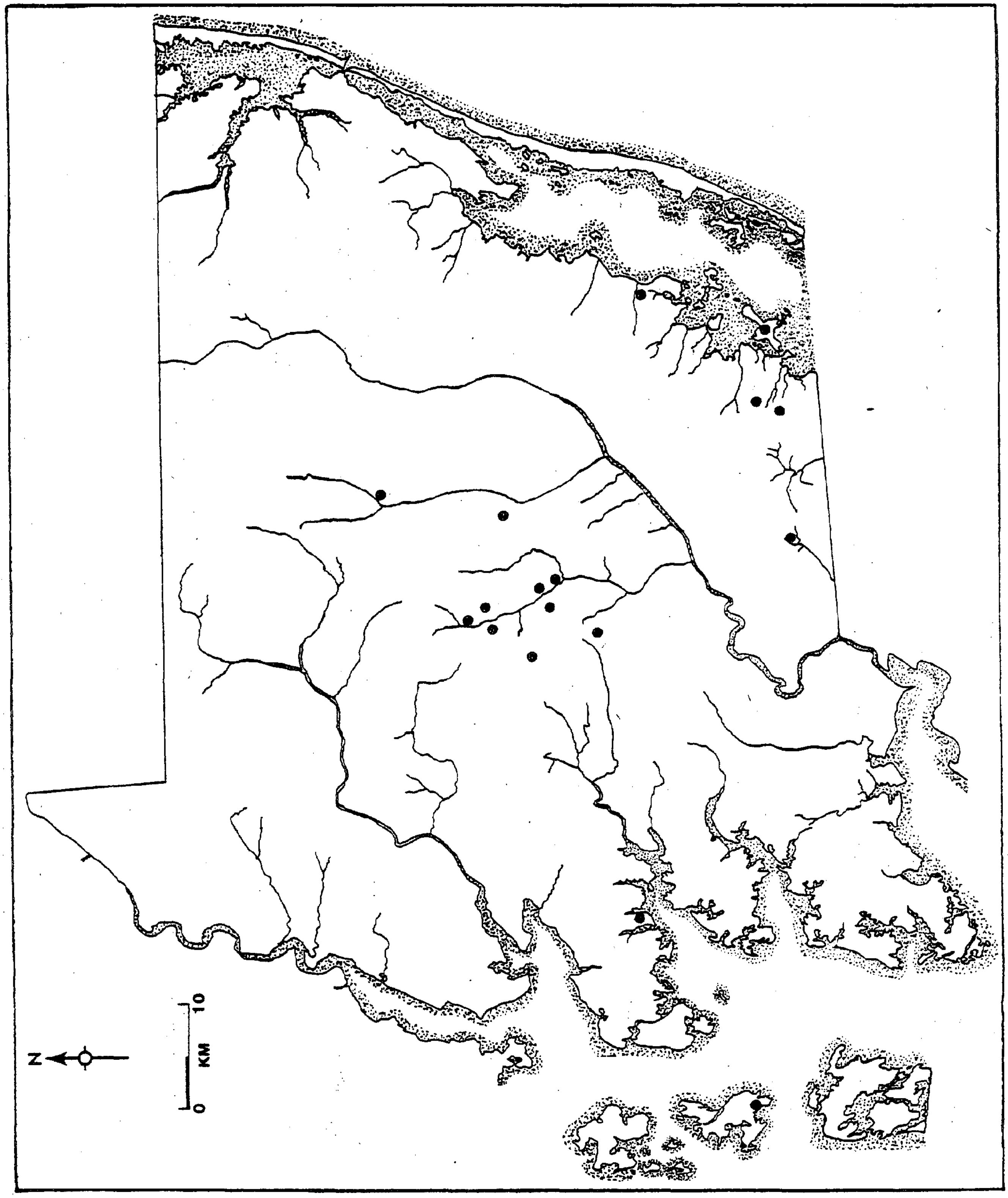


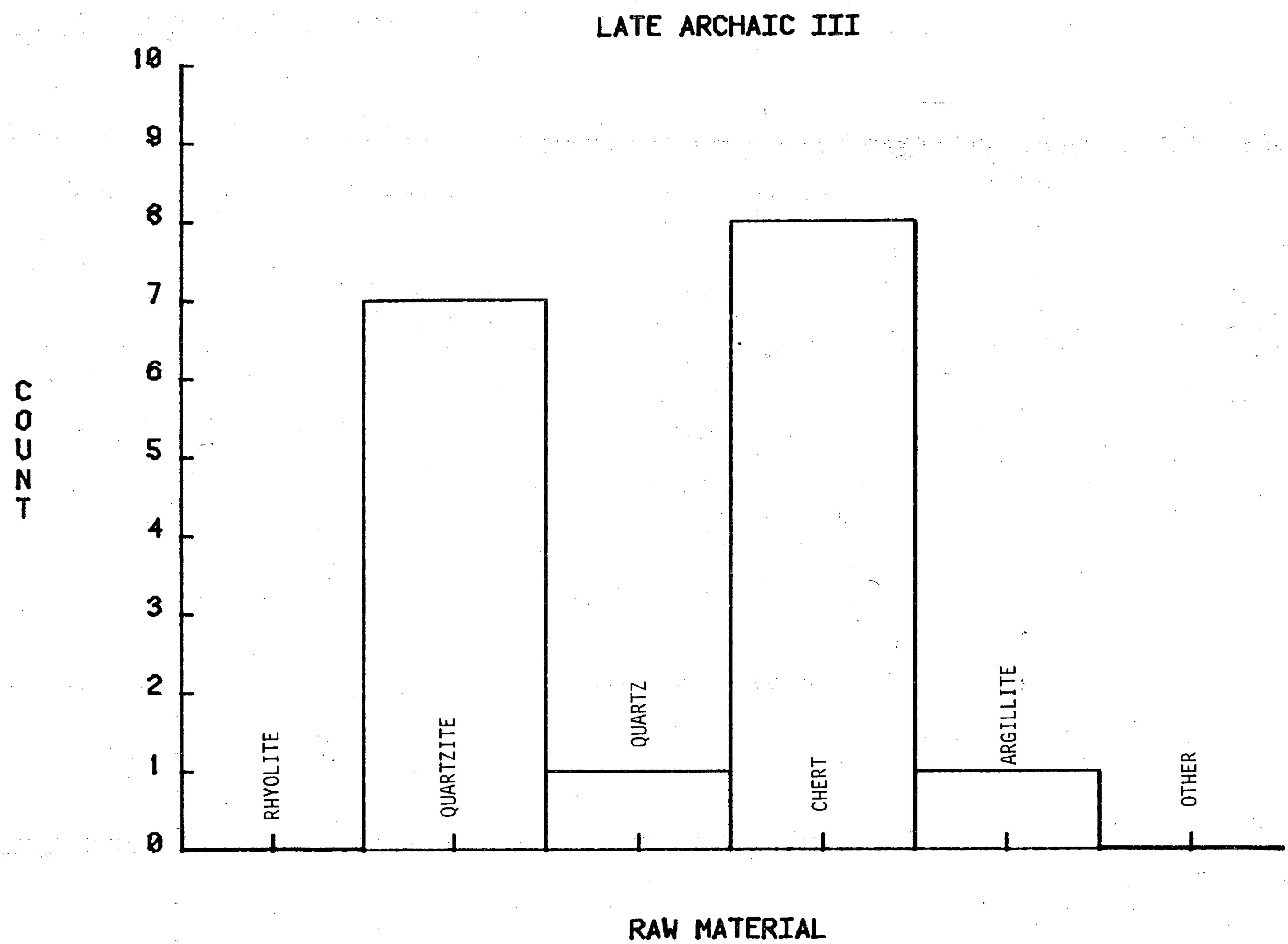
Figure 44 : LATE ARCHAIC II

representative of the Piedmont tradition, being made predominantly of local chert (47%) and quartzite (41%) (see Figure 45) with a morphological form very reminiscent of earlier Morrow Mountain and Guilford traditions.

The distribution of Late Archaic III sites seems to show a shift away from the coastal areas, but it is not clear if this is a result of sea level rise inundating sites or possible collector bias; or if a true shift in population, or a decreasing use of the area as a whole and the coasts in particular was occurring (see Figure 46). The numbers of actual Holmes points, while moderately represented, show a definite decrease from the previous phase. This situation is very different from the Patuxent drainage where the number of sites also decrease, but the number of Holmes points increase dramatically to be the most numerous point type in the area (Steponaitis 1980:85).

Broadspear Tradition (Late Archaic Phases IV and V):

The Broadspear Tradition is thought to have developed out of the Piedmont tradition sometime around the second millennium B.C. and lasted until about 1500 B.C. Broad-bladed points or "broadspears" and carved steatite bowls are the artifactual markers of this period. The Broadspear tradition is seen to represent a period during which the subsistence strategy shifted from an emphasis on riverine zone exploitation. Witthoft (1953) sees the Broadspear cultures focusing on the exploitation of andromous fish which would have been well established in rivers and streams by this time when sea level was only about 3 to 5 meters below



LATE ARCHAIC III
COUNT
10
9
8
7
6
5
4
3
2
1
0
RHYOLITE
QUARTZITE
QUARTZ
CHERT
ARGILLITE
OTHER
RAW MATERIAL

FIGURE 45

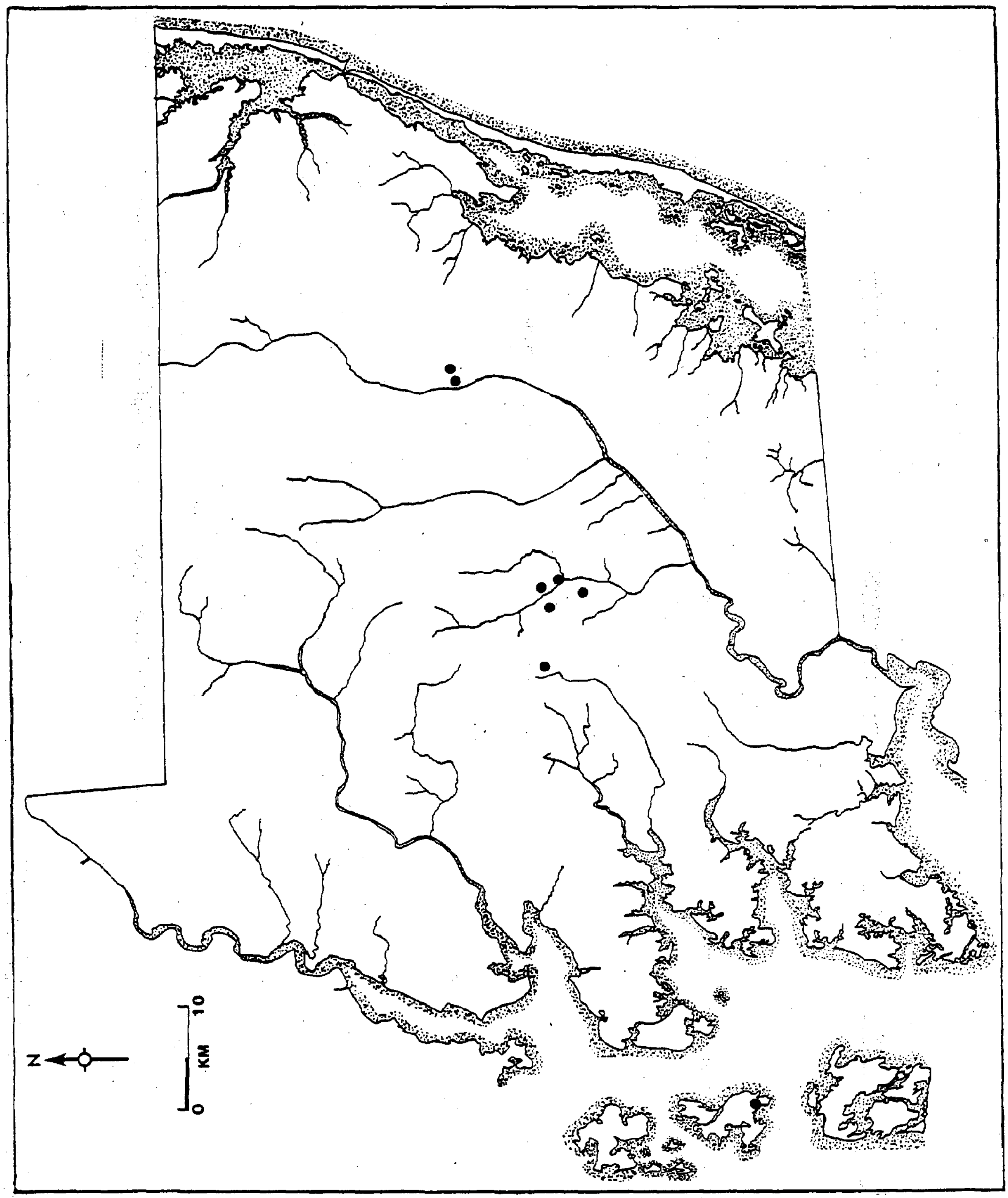


Figure 46 : LATE ARCHAIC III

its current level. This is a time when the climate was shifting to the warm, dry conditions of the sub-Boreal and both Kinsey (1972) and Custer (1978) see the changing subsistence strategy as an adaptive response to this climatic shift.

Late Archaic IV:

The similar Savannah River and Koens-Crispin points mark the Late Archaic IV phase (1900-1700 B.C.). The Koens-Crispin point is considered to be the northern variant of the Savannah River point and it is interesting to note that it is far more numerous in the study area than the southern oriented Savannah River. This may reflect a stronger northern influence on the area due to its physiographic isolation from the south and east by this time. The Savannah River points from the study area are all made of rhyolite, while the majority of Koens-Crispin points are manufactured from quartzite and chert with rhyolite being secondarily used (see Figure 48). Steatite bowl fragments do occur within the study area which agrees with evidence from tbe Patuxent River area (Steponaitis 1980:89). Steatite bowls are not good temporal phase markers as they occur during both Broadspear phases as well as in the later Fishtail tradition. The distribution of steatite bowl fragments within the study area is shown in Figure 47.

Based upon the distribution of Late Archaic IV phase material within the study area (see Figure 49), it would appear that there has been some shifting of sites to lower reaches of streams and rivers, best

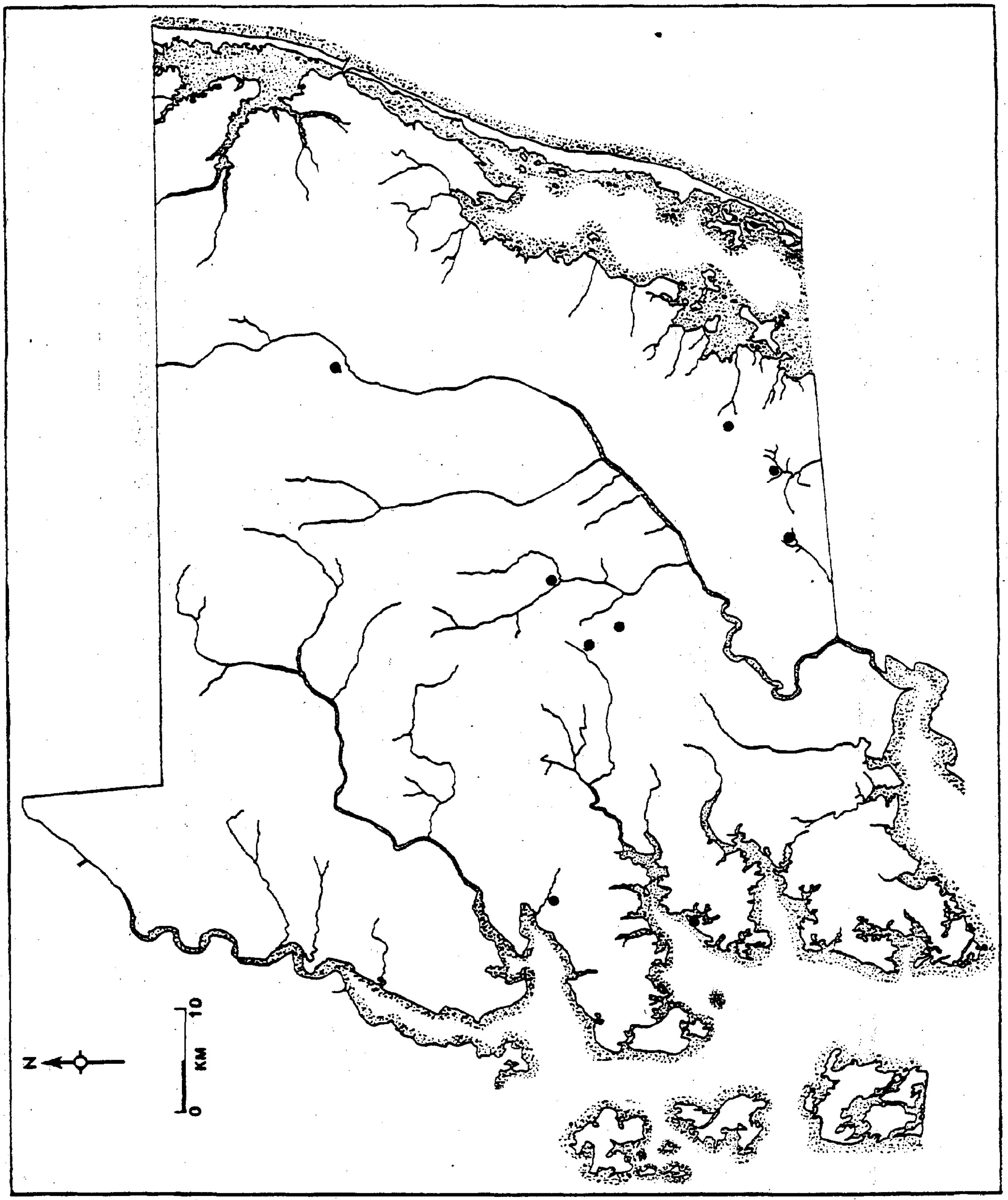


Figure 47 : DISTRIBUTION OF STEATITE VESSEL FRAGMENTS

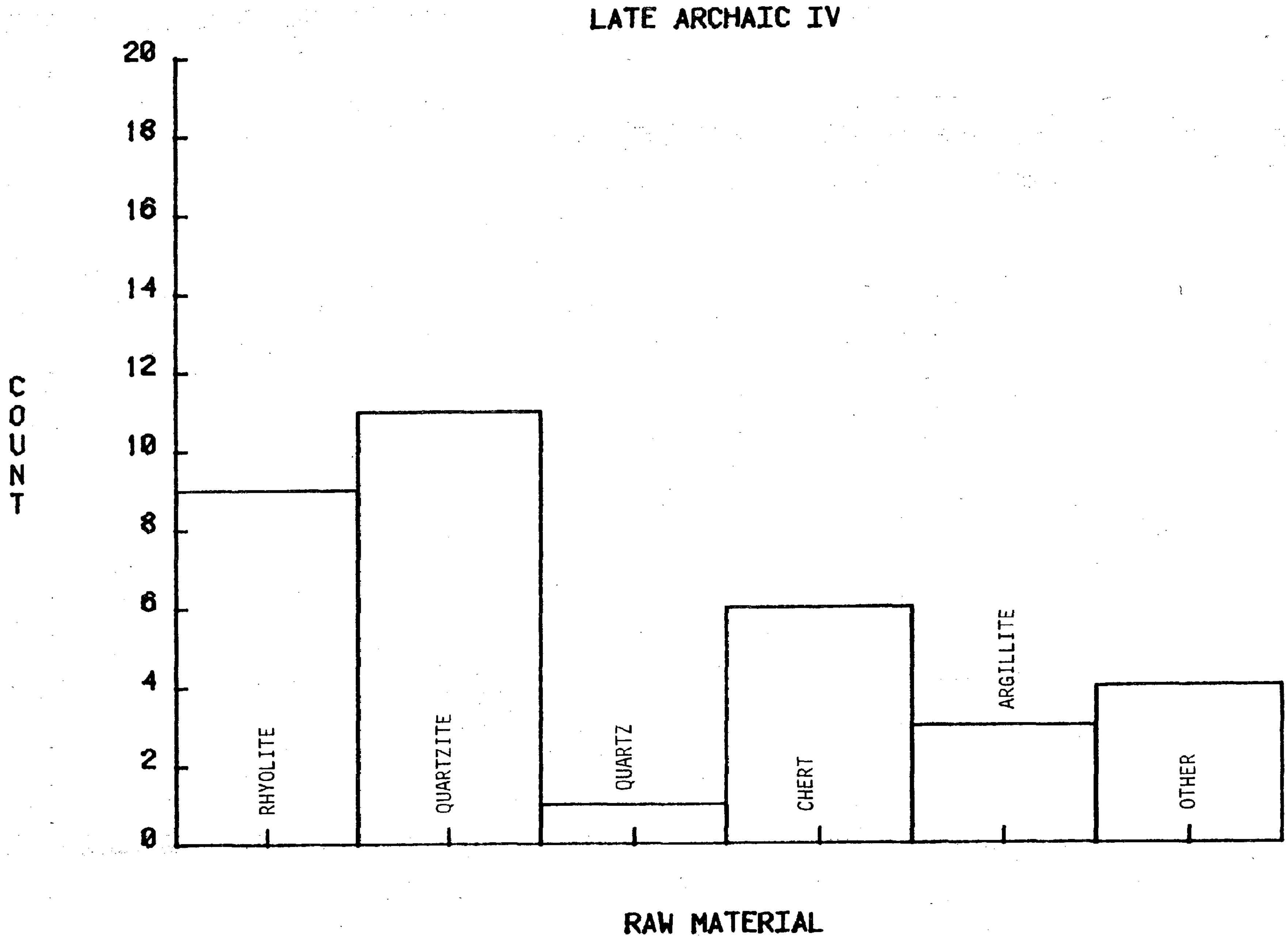

LATE ARCHAIC IV
COUNT
20
18
16
14
12
10
8
6
4
2
0
RHYOLITE
QUARTZITE
QUARTZ
CHERT
ARGILLITE
OTHER
RAW MATERIAL

FIGURE 48

LATE ARCHAIC IV

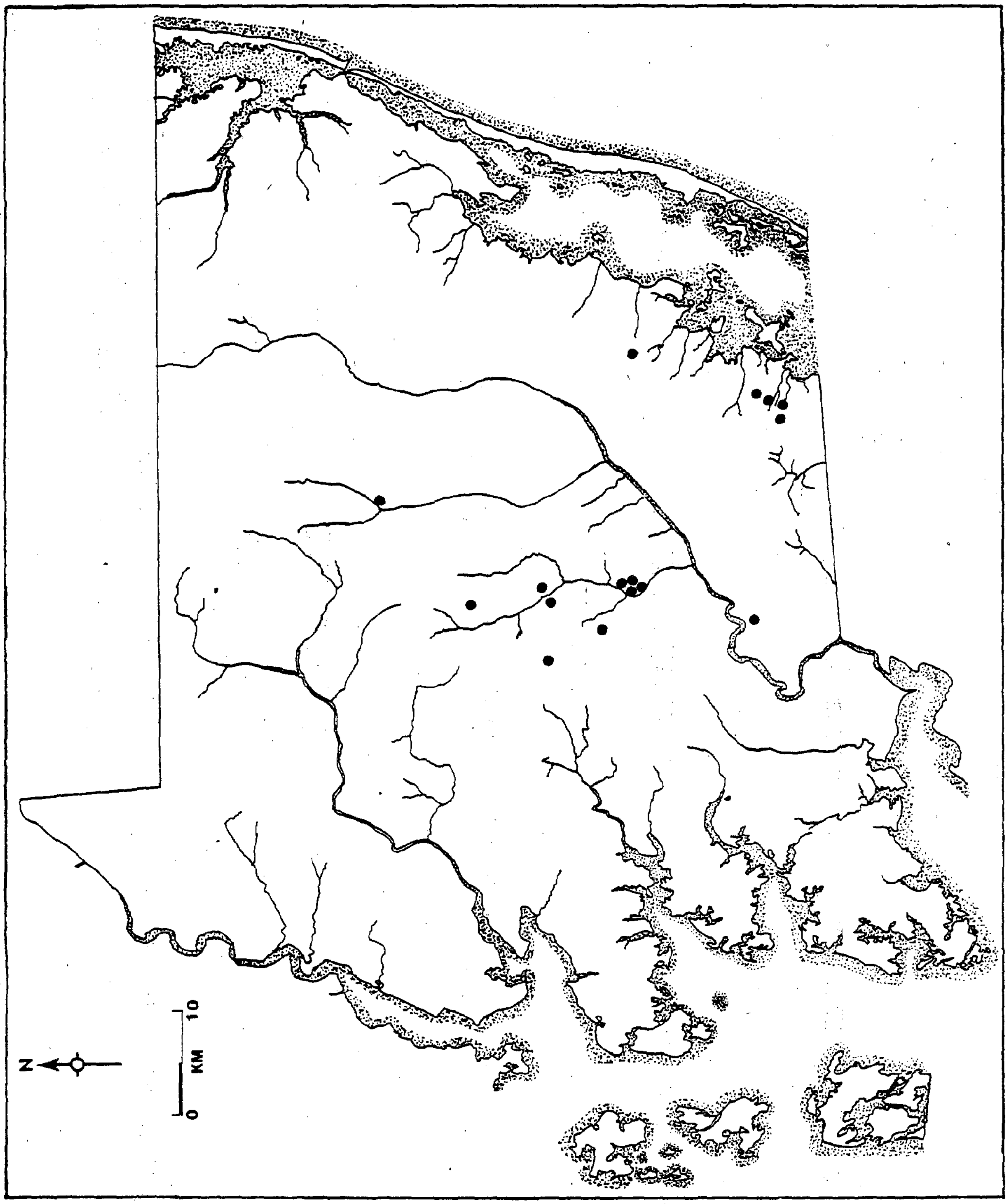
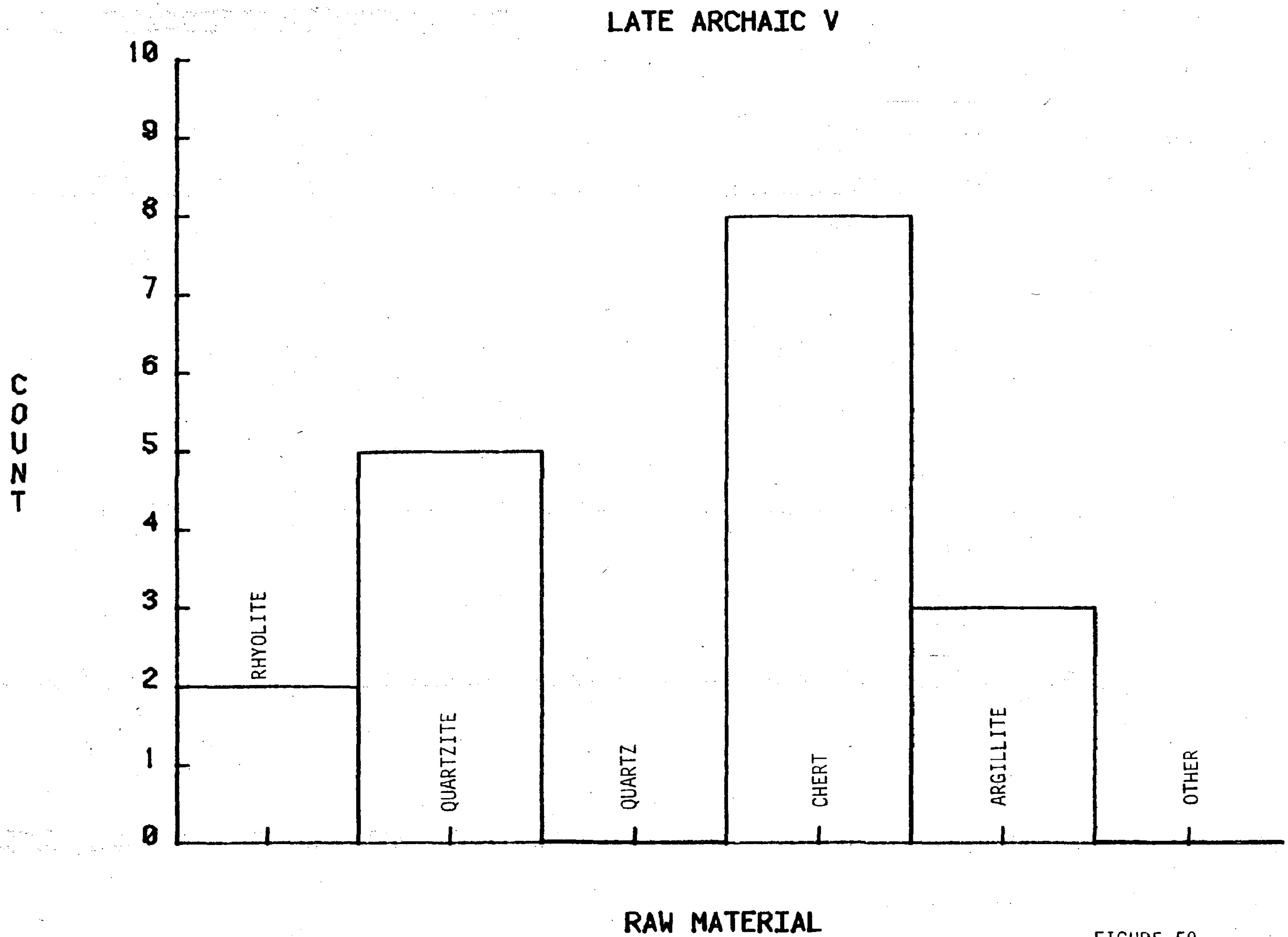


FIGURE 49 : LATE ARCHAIC IV

seen along Dividing Creek, and to the Atlantic drainage area. Bearing in mind the previous discussion of a shift to a riverine focus during this tradition, these downstream shifts may reflect the move from what would have probably been more upland swamp areas at this time to the lower stream reaches where anadromous fish would be present. There is no direct evidence of such a shift, but the previously mentioned evidence from Kent County makes such a move seem likely. An absence of sites from the riverine areas of the Chesapeake Bay side of the peninsula is puzzling, but inundation may again explain this as the river valleys approached their present wide bay-like morphology.

Late Archaic V:

The Perkiomen Broadspear and Susquehanna Broadspear points mark the Late Archaic V phase (1700-1500 B.C.). Perkiomen points are somewhat more common in the study than Susquehanna points. Argillite and rhyollite were more often used for Susquehanna points than for Perkiomen points where chert and quartzite were the favored raw materials (see Figure 50). This agrees with the same general trends noted in the Piedmont area by Kinsey (1972). Custer's (1978) suggestion that these points were likely used in the manufacture of bone and wood tools seems possible when noting their seemingly inefficient shapes as projectile points. However, other authors (for example Kinsey 1972 and Witthoft 1953) see these points as "toggle" harpoons used in the exploitation of fish resources. Microwear studies of use-wear on these points could aid in solving this question. For now, it seems likely that the subsistence



LATE ARCHAIC V
COUNT
10
9
8
7
6
5
4
3
2
1
0
RHYOLITE
QUARTZITE
QUARTZ
CHERT
ARGILLITE
OTHER
RAW MATERIAL

FIGURE 50

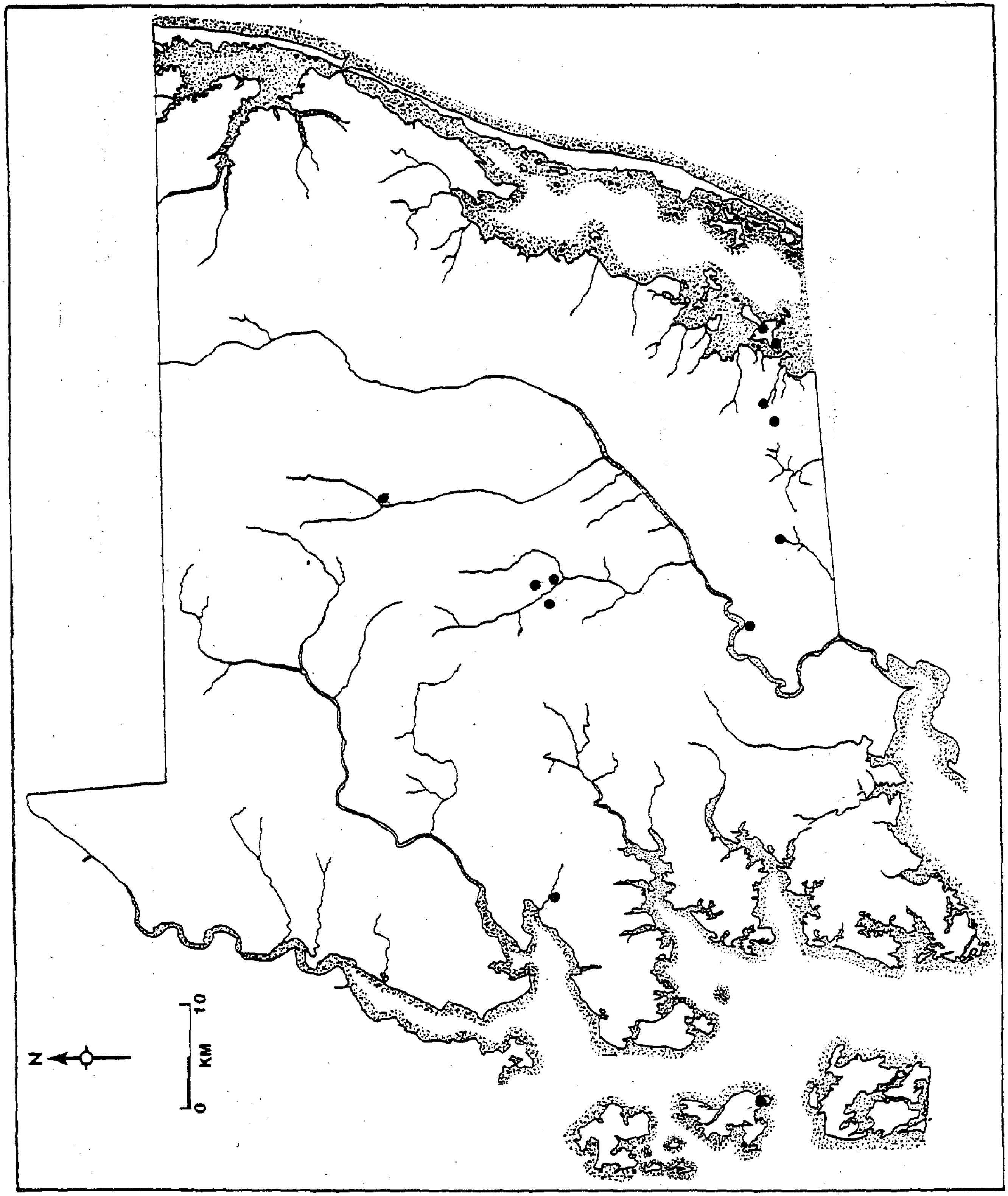


Figure 51 : LATE ARCHAIC V

strategy of the Broadspear culture was based on a hunting, gathering, shellfishing and fishing round along tidal streams and estuaries (Wilke and Thompson 1979). The slowing of sea level rise which began around 4000 years ago would have stablized coastal environments so that large numbers of waterfowl, anadromous fish and shellfish would have been available for exploitation. In Delaware, Broadspear tradition sites occur along rivers where there are large dense sites and inland where smaller sites are found. The distribution of Late Archaic V sites as seen in Figure 51 shows a slight decline in numbers from the previous phase but still indicates a preference for river and stream drainages and a shift back to the Bay shore areas. Some inland sites on smaller streams probably are short term hunting and gathering sites.

<u>Fishtail Tradition (Late Archaic VI and Marcey Creek)</u>:

The Fishtail Tradition is transitional between the Late Archaic period and the Early Woodland Period (1500 to 750 B.C.). The Orient and Dry Brook points mark this period and are seen by Kinsey (1972) as a result of the "convergence of the Perkiomen and Susquehanna phases." Steatite bowls are associated with these points during the Late Archaic; while the appearance of steatite-tempered Marcey Creek ceramics with the two point types marks the Early Woodland period.

An environmental change was occurring at this time from the sub-Boreal warm, dry conditions to the mild and wet conditions of the sub-Atlantic which have persisted until the present. As mentioned earlier, the sea level rise had slowed considerably allowing coastal and estua-

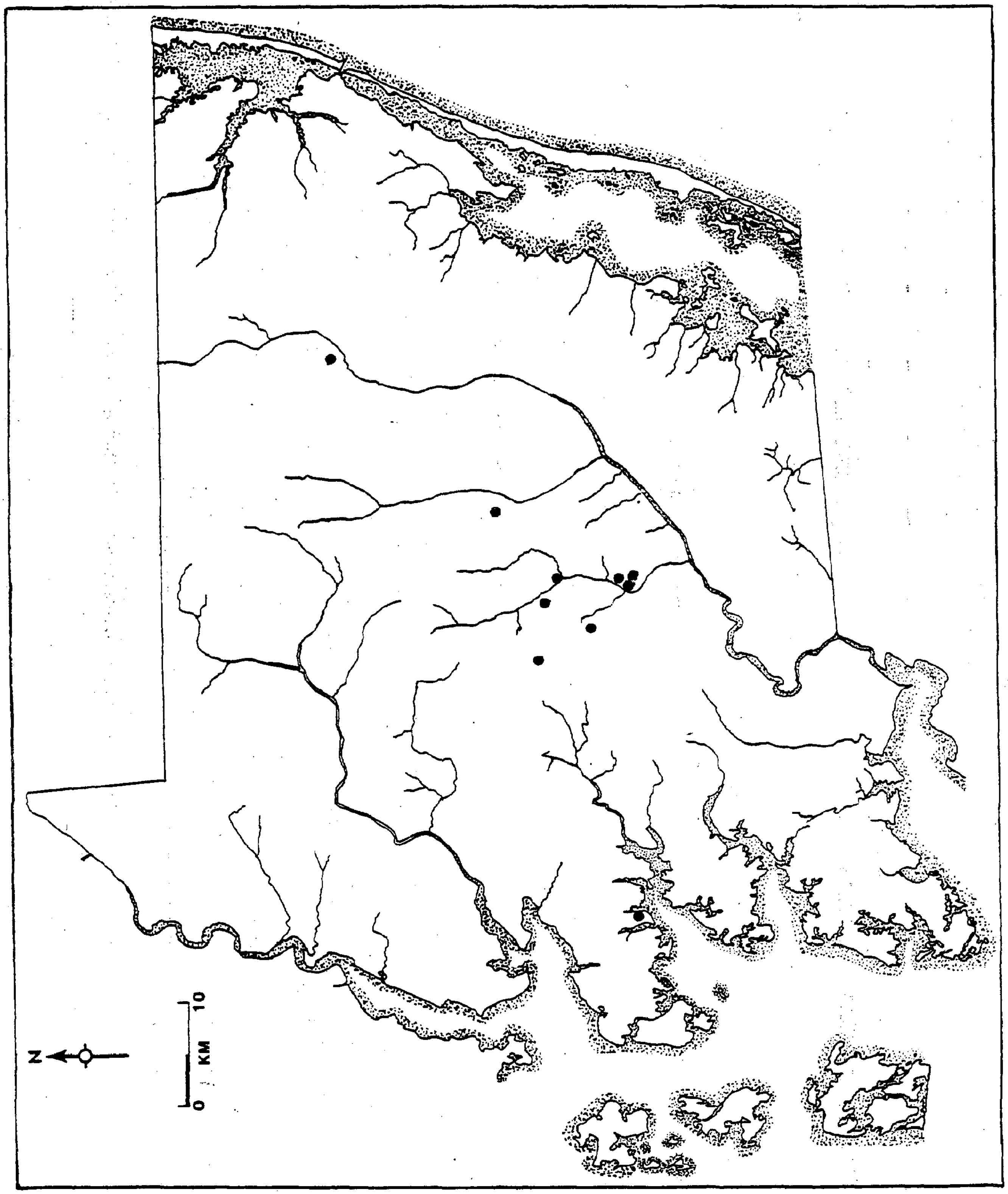


Figure 52 : LATE ARCHAIC VI

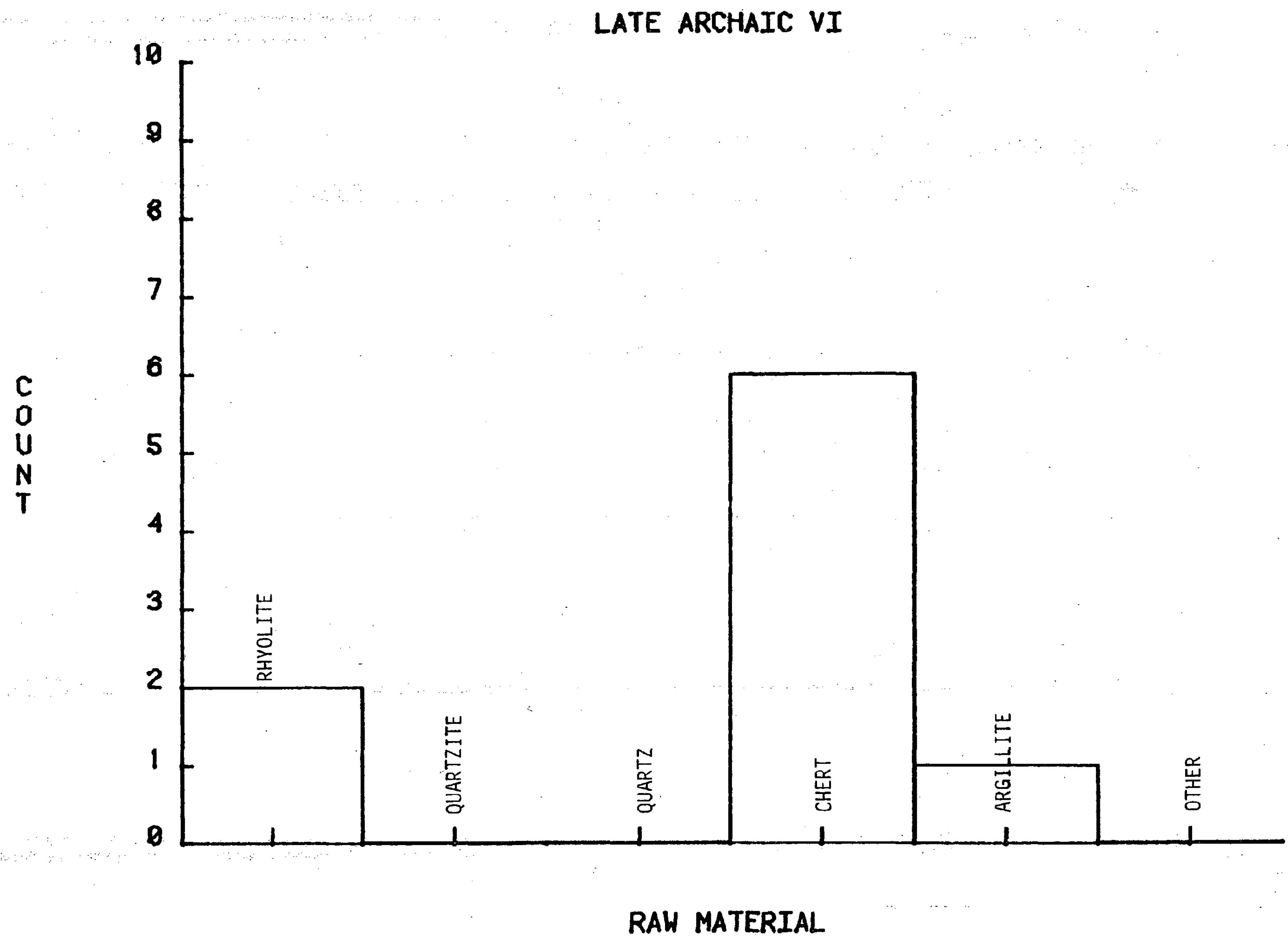

LATE ARCHAIC VI
COUNT
10
9
8
7
6
5
4
3
2
1
0
RHYOLITE
QUARTZITE
QUARTZ
CHERT
ARGILLITE
OTHER
RAW MATERIAL

FIGURE 53

rine environments to stabilize.

Site distribution as seen in Figure 52 for the Late Archaic VI phase seems to indicate a continued emphasis on upstream parts of tributaries and rivers along the general pattern of the earlier Broadspear tradition. Kinsey (1972) states that the Fishtail settlement and subsistence base is a continuation of the earlier Broadspear strategy. The evidence from the study area seems to fit this conception.

EARLY WOODLAND

The environmental change to mild,wet conditions which began during the final phase of the Late Archaic period was complete by the middle of the Early Woodland (1200-700 B.C.). By the end of the Early Woodland sea level rise should have slowed to such an extent that coastal and estuarine environments would have shown distributions of plant and animal communities very similar to today, although the coastal zones would not show as extensive a drowned topography as at present.

Marcey Creek Phase:

The Marcey Creek Phase is distinguished by presence of steatite tempered ceramics and Fishtail points. Selden Island ceramics may also be associated with this period. Thomas (1974) suggests that middle drainage areas of large streams were the focus of Early Woodland cultures, while Gardner (1978) sees very little to distinguish the Early Woodland from the Late Archaic as regards settlement and subsistence

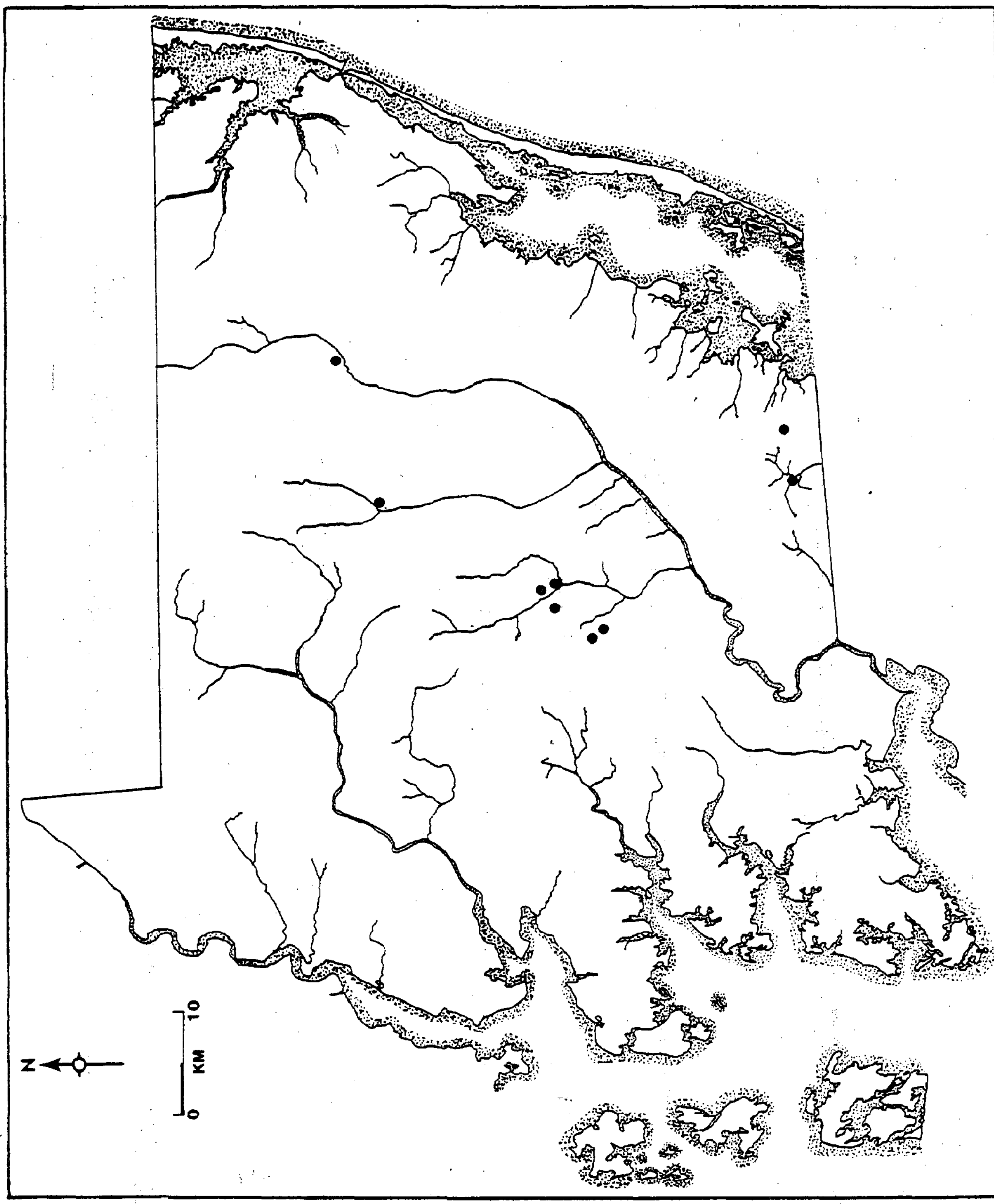


Figure 54 : EARLY WOODLAND - TOTAL SITES

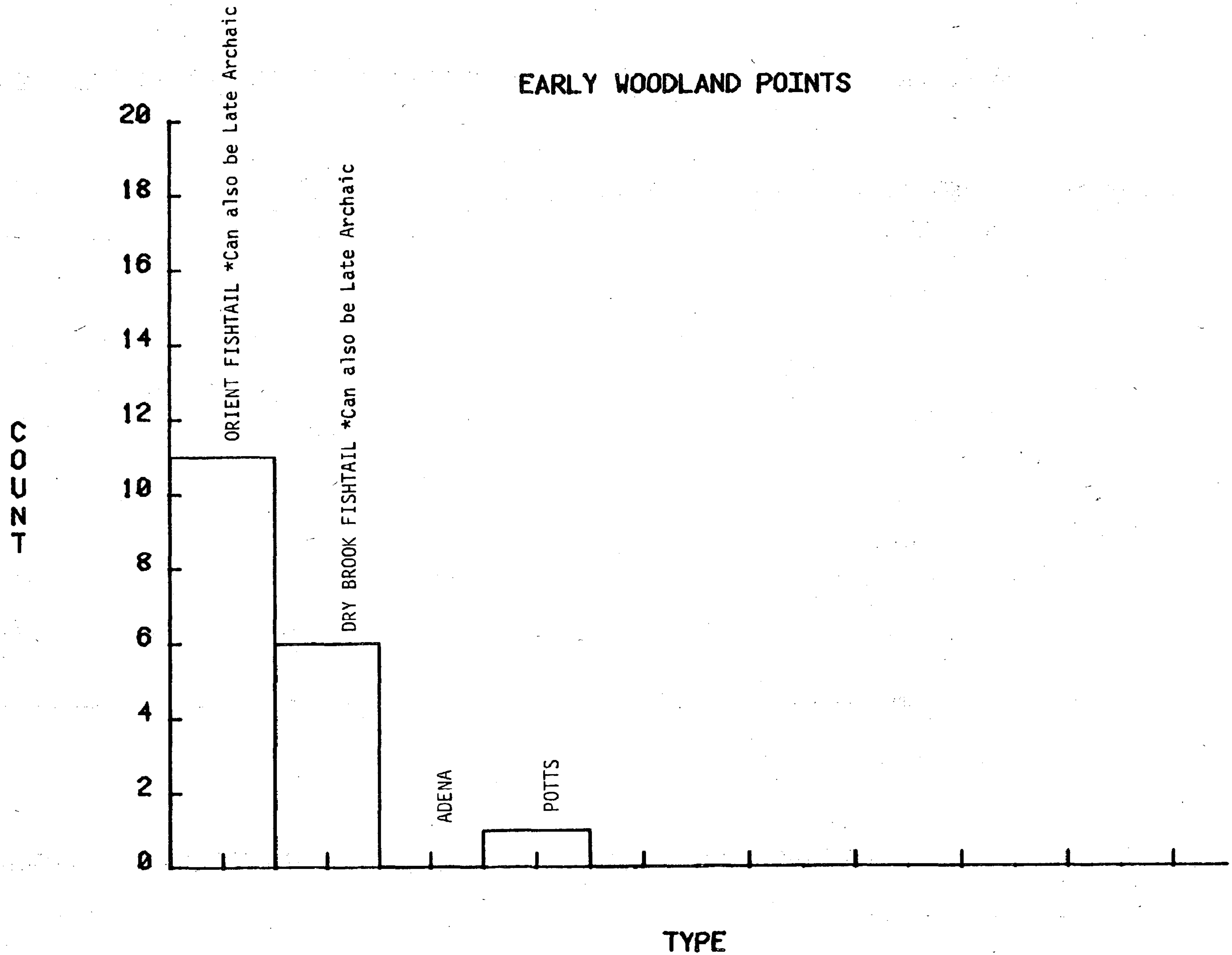

EARLY WOODLAND POINTS
COUNT
20
18
16
14
12
10
8
6
4
2
0
ORIENT FISHTAIL *Can also be Late Archaic
DRY BROOK FISHTAIL *Can also be Late Archaic
ADENA
POTTS
TYPE

FIGURE 55

patterns on the Potomac coastal plain. Wilke and Thompson (1977) see shellfish exploitation as an important resource activity.

McNett and Gardner (1975) postulate that Marcey Creek Ware would not be manufactured on the Coastal Plain due to a lack of steatite sources. Steponaitis (1980:94-95) does mention the presence of Marcey Creek Ware in the Patuxent drainage, but none of the collections examined for this study had any Marcey Creek, Selden Island or Ware Plain ceramics present in them. The reason for this is hard to understand as steatite fragments do occur, showing it was being traded, presumably during the Late Archaic, and these ceramic types are known to occur above the study area in Delaware. It is possible that a conservative Late Archaic tradition continued within the study area without ceramics until the introduction of Dames Quarter Ware. Dames Quarter Ware is particularly associated with the study area, being named for a location in Somerset County. It is possible that this pottery type represents the first use of ceramics within the study area, however such a judgment must await further data gathered in a more systematic fashion.

Dames Quarter Phase:

The Dames Quarter Phase (1000-700 B.C.) is marked by the presence of Dames Quarter Black Stone Tempered ceramics. This pottery is characterized by the use of a flat bottom with a coiled base and generally a smooth surface although cord and fabric markings are known (Wise 1975). Ware Plain ceramics, a crushed quartz, sand or limestone tempered ceramic probably also occurs during this time and is similar to Dames

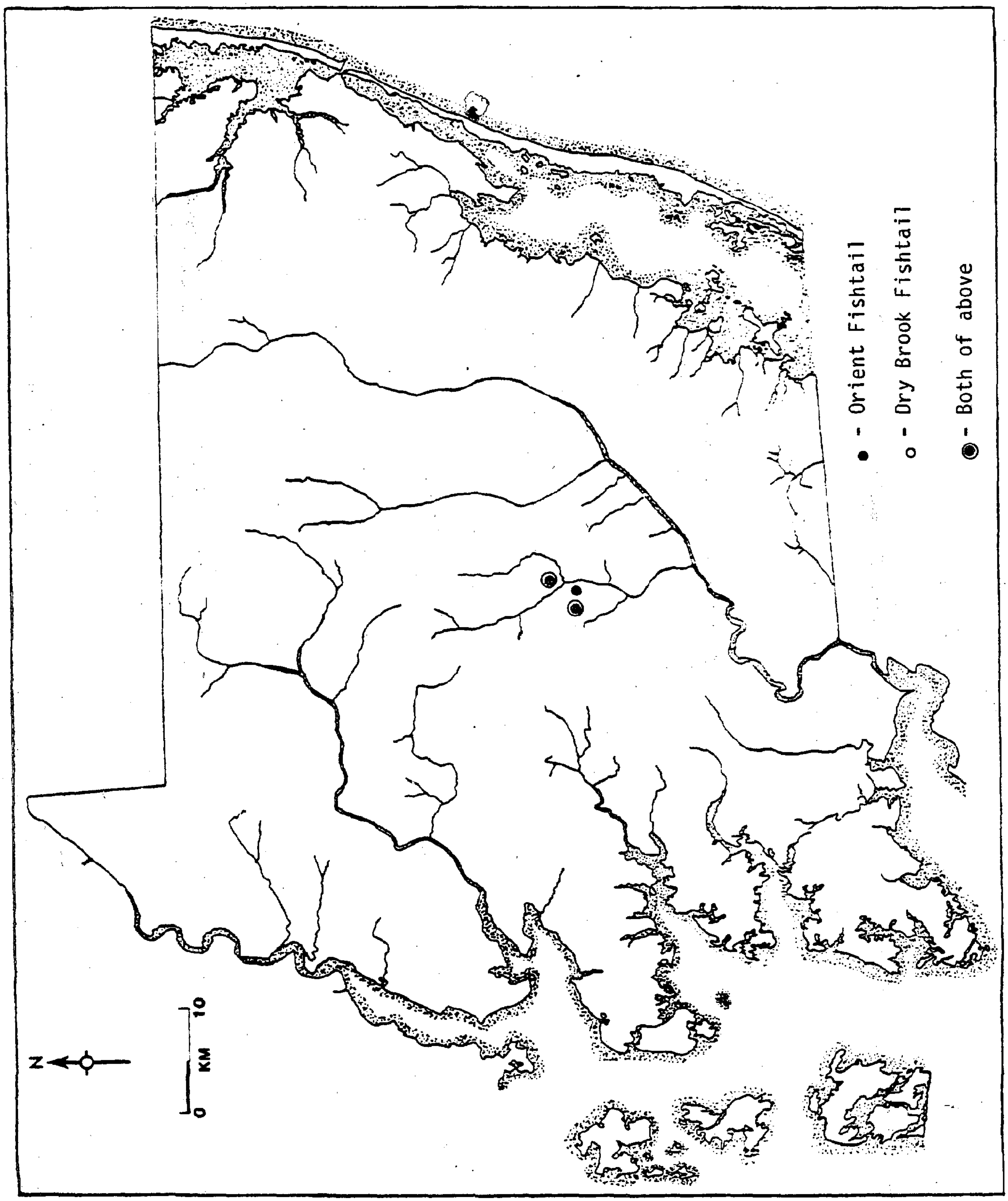


Figure 56 : PROJECTILE POINTS ASSOCIATED WITH DAMES QUARTER PHASE CERAMICS

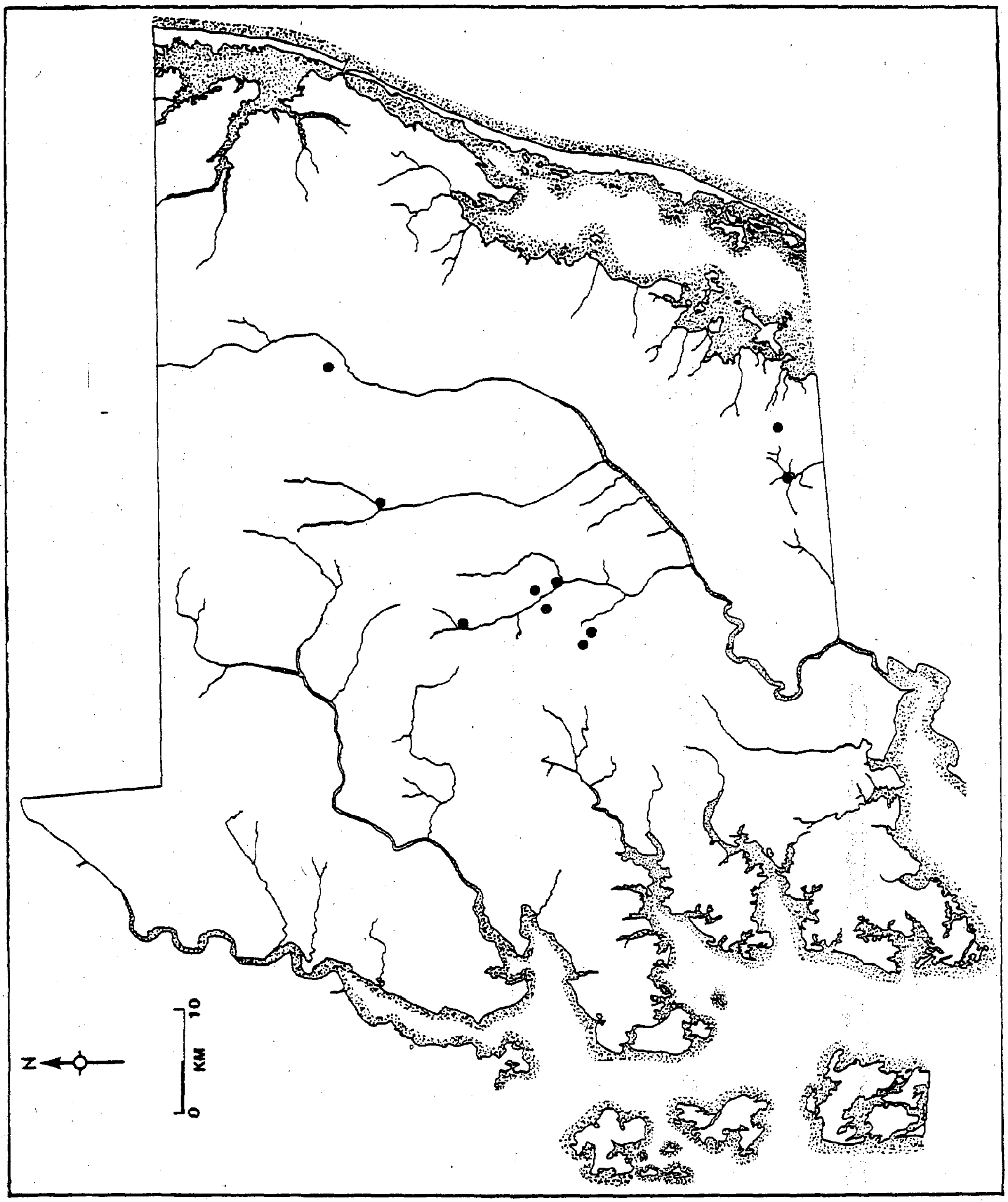


Figure 57 : EARLY WOODLAND - DAMES QUARTER PHASE

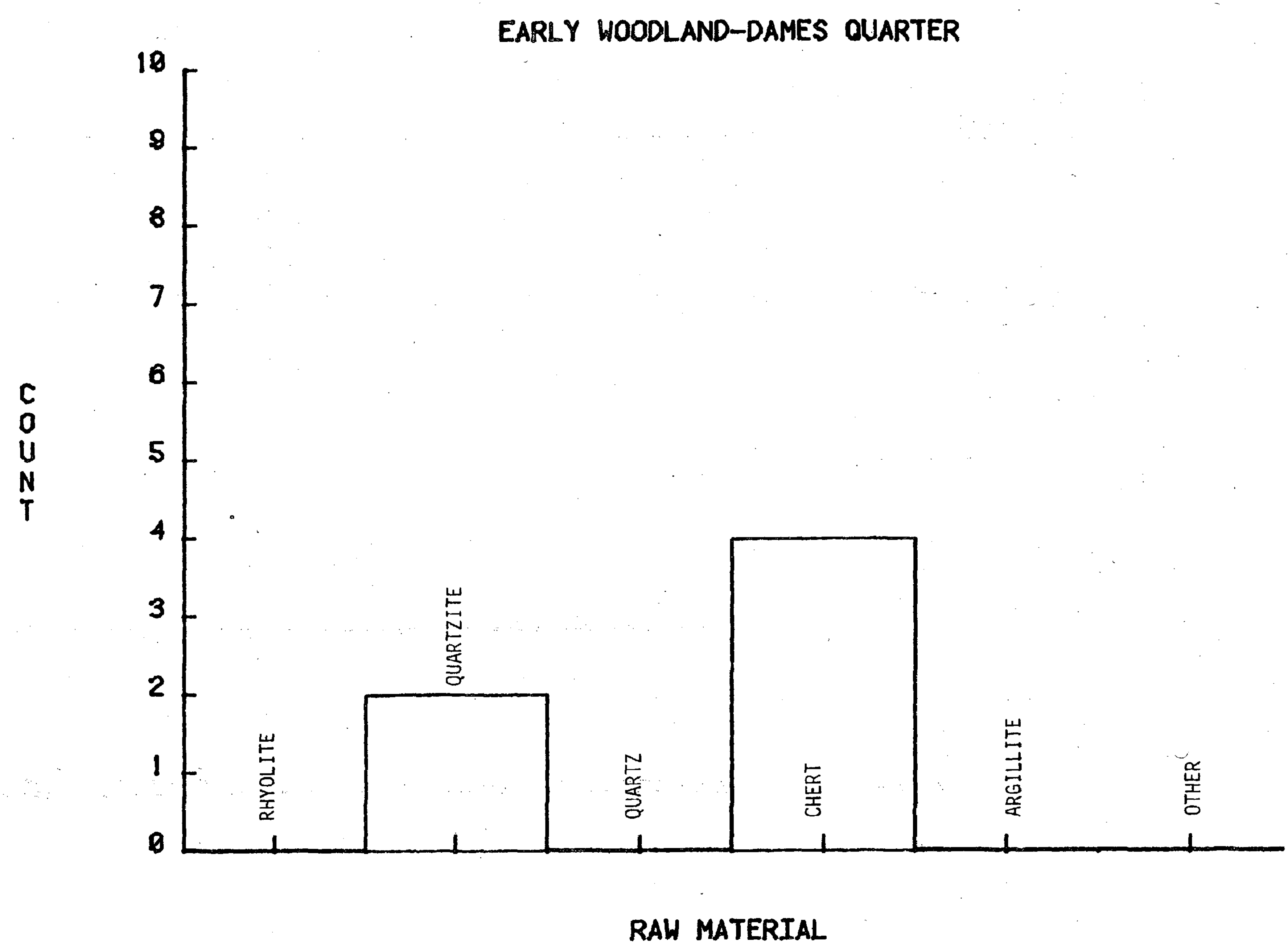

EARLY WOODLAND-DAMES QUARTER
COUNT
0
1
2
3
4
5
6
7
8
9
10
RHYOLITE
QUARTZITE
QUARTZ
CHERT
ARGILLITE
OTHER
RAW MATERIAL

FIGURE 58

Quarter ware (Wise 1975).

Selden Island ceramics, a soapstone tempered coiled conoidal-shaped ware, likely also occurs during the same time period (Artusy 1977). No Selden Island ware was present within the collections examined for this study. The point type associated with the Dames Quarter phase is not clear. Throughout the Early Woodland period, the association between ceramic and lithic types is vague at best. Based on collections examined for this study, it appears that Fishtail tradition points (Orient and Dry Brook) are the most strongly associated types with Dames Quarter ceramics, occurring together in 50% of cases (see Figure 56).

The Dames Quarter phase can be seen as either a dramatic shift from the seeming depopulation of the Marcey Creek phase, or as a direct outgrowth of the Late Archaic VI Fishtail Tradition. Settlement pattern evidence as observed during this study (see Figure 57) shows little change from the Late Archaic VI phase. A slight shift to more riverine upstream areas of the secondary streams and to the Atlantic coastal drainage areas may be occurring, but sampling bias could just as easily explain these minor shifts. Gardner's (1978) work in the upper Potomac coastal plain, showed little difference between Early Woodland and Late Archaic settlement patterns. His data indicate an emphasis on larger streams with a scatter of transient camps in the uplands. Wilke and Thompson (1977) find evidence of extensive shellfish exploitation during this period. There are no sites of the Dames Quarter Phase situated in estuarine areas or shoreline areas, but sea level rise and inundation could have obscured such sites along the Atlantic and Bay shores.

A more likely explanation for site distribution is that a subsistence strategy similar to the Late Archaic, with exploitation of larger streams as the main focus, continued throughout the Early Woodland period in the study area. This agrees with Gardner's (1978) conclusions in the Potomac coastal plain and seems to represent a conservative continuation of the subsistence and settlement pattern which arose during the Early Archaic Broadspear tradition.

MIDDLE WOODLAND PERIOD

The Middle Woodland Period (700 B.C. to A.D. 1000) is characterized on Maryland's lower Eastern Shore by the initial appearance of Wolfe Neck Ware, a crushed quartz tempered ceramic with either cord or net decoration (Artusy 1977). There has been some dispute as to whether Wolfe Neck Ware and the succeeding Coulbourn ware belong in the Early Woodland or Middle Woodland period. Evidence from Delaware seems to indicate that the appearance of Wolfe Neck ware signals a clear break with earlier traditions, both on a technological level and a subsistence-settlement pattern level. Artusy (1977) notes:

> Wolfe Neck, Coulbourn and Mockley display a marked similarity in ceramic attributes with the only real difference being temper. This change in temper from quartz to clay to shell, is not dramatic and in many cases is extremely subtle. Not only do ceramics exhibit stabilization when viewed as a tradition of cord and net exterior surface treatments, but these ceramics are often located at the same site, demonstrating a similar settlement pattern and resource collection system.

This same shift in settlement pattern as well as a dramatic increase in site and artifact density is noted within the study area. Based upon

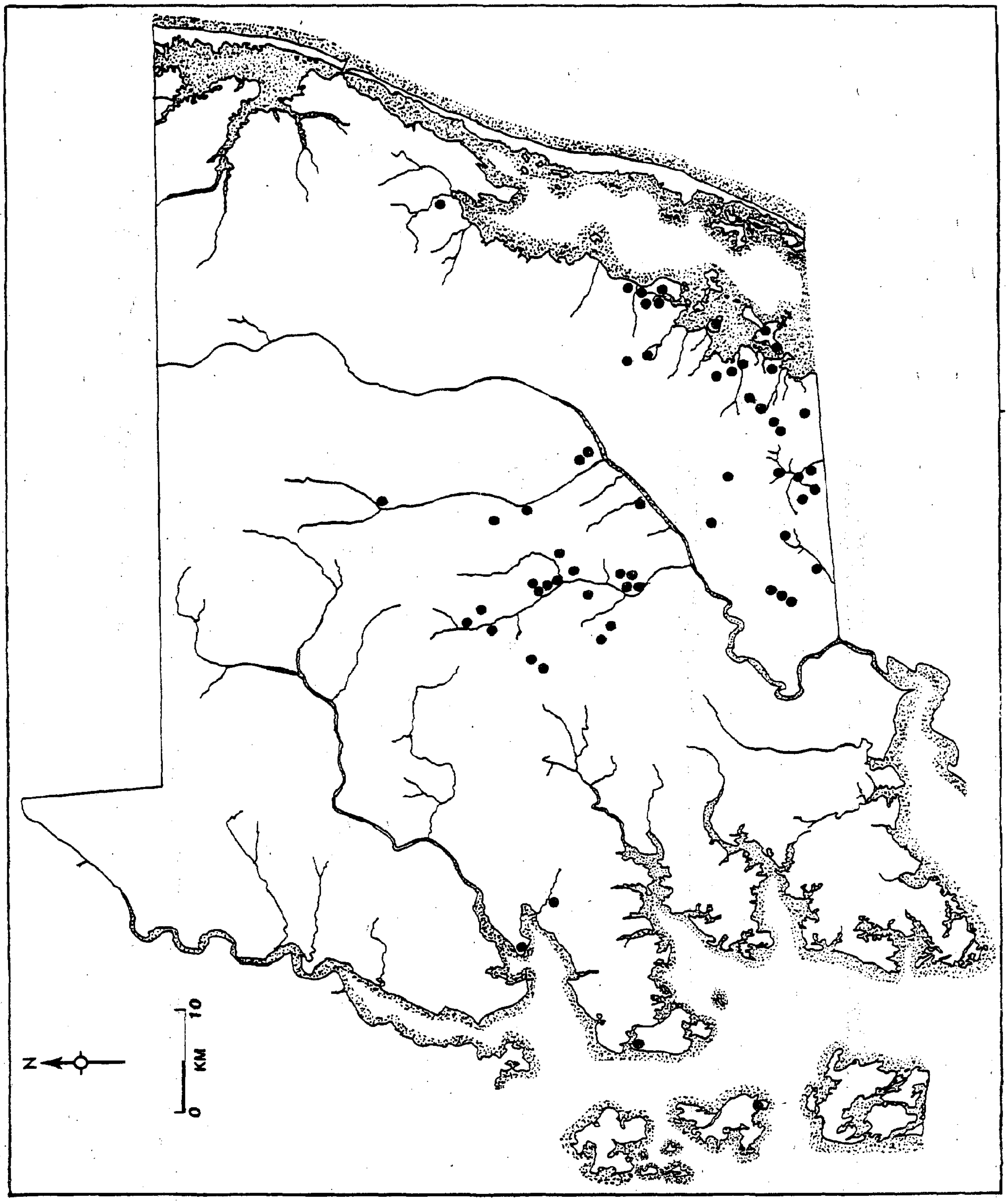


Figure 59 : MIDDLE WOODLAND-TOTAL SITES

MIDDLE WOODLAND POINTS

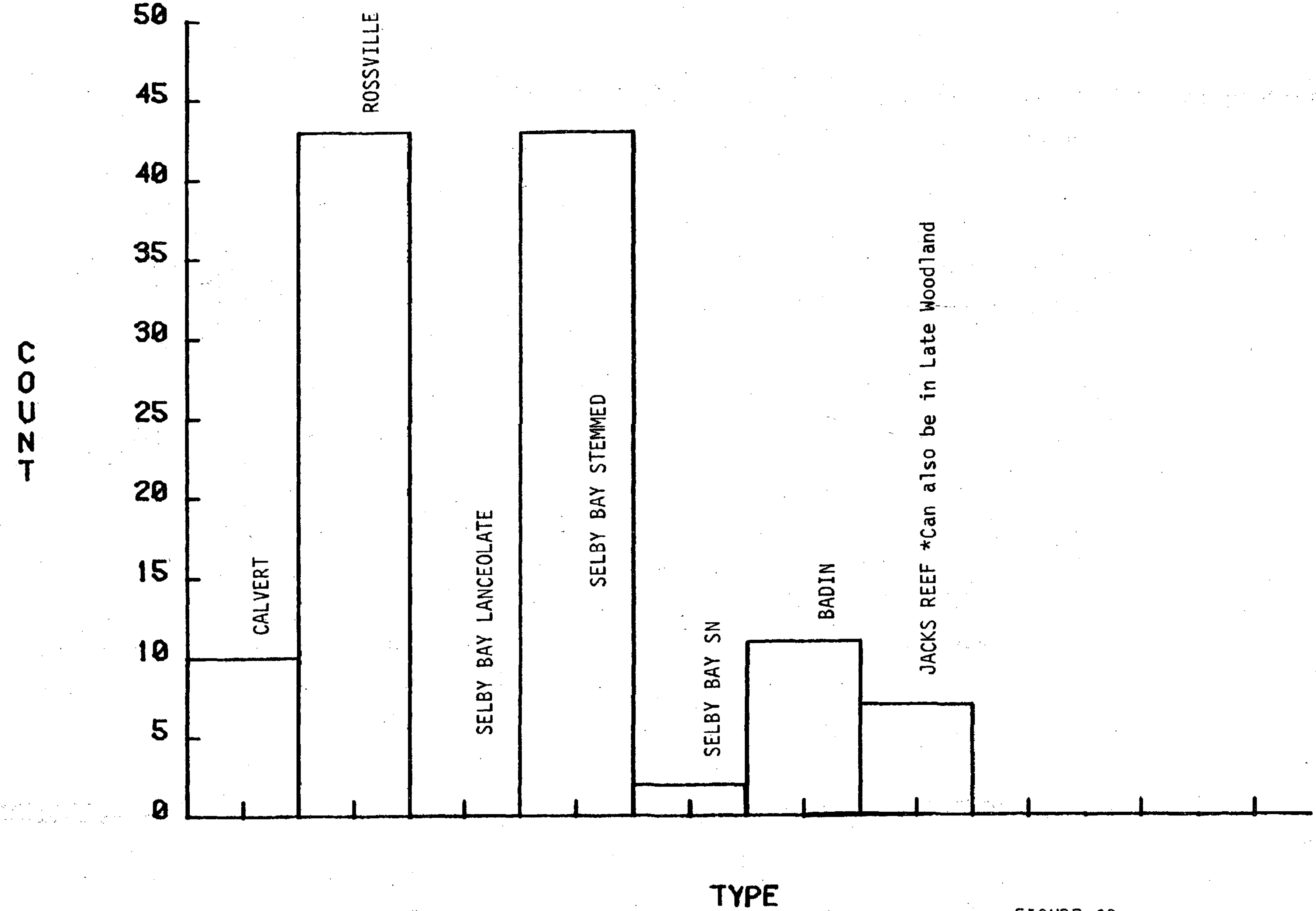


FIGURE 60

these observations, it was felt that the Delaware definition of the Middle Woodland phase was the most applicable to Maryland's lower Eastern Shore.

It should be noted that such a dating system places the previously discussed (see Chapter III) Delmarva-Adena archaeological complex within the Middle Woodland period on the Eastern Shore. This complex of exotic traits is dated from approximately 400 B.C. to A.D. 100. Known primarily from partially excavated burial sites, little is known of the non-ceremonial aspects of this cultural manifestation. The study by Wise (1974) of the Nassawango Creek site material from Worcester County indicates a predominant association of quartz-tempered ceramics (Wolfe's Neck Ware) with Rossville points. Observation of the artifacts from this site during this summer's study confirms such an association. Materials of this sort were present in two of the four burial features excavated at the site. A strong Selby Bay component at the site, along with a total lack of classic Adena blades, may hint at a Hopewellian influence rather than an Adena one. Further study of the material is needed.

<u>Wolfe Neck Phase</u>:

The Wolfe Neck Phase, dating from 700 B.C. to A.D. 110, is characterized by the presence of Wolfe Neck ceramics and probably Calvert and Rossville points during its early part (ca. 700 to 400 B.C.), and by Coulbourn ceramics with Rossville and Potts points during its later part (400 to 100 B.C.). These ceramic and point types are much more common than the preceeding Dames Quarter phase materials, with the Wolfe Neck

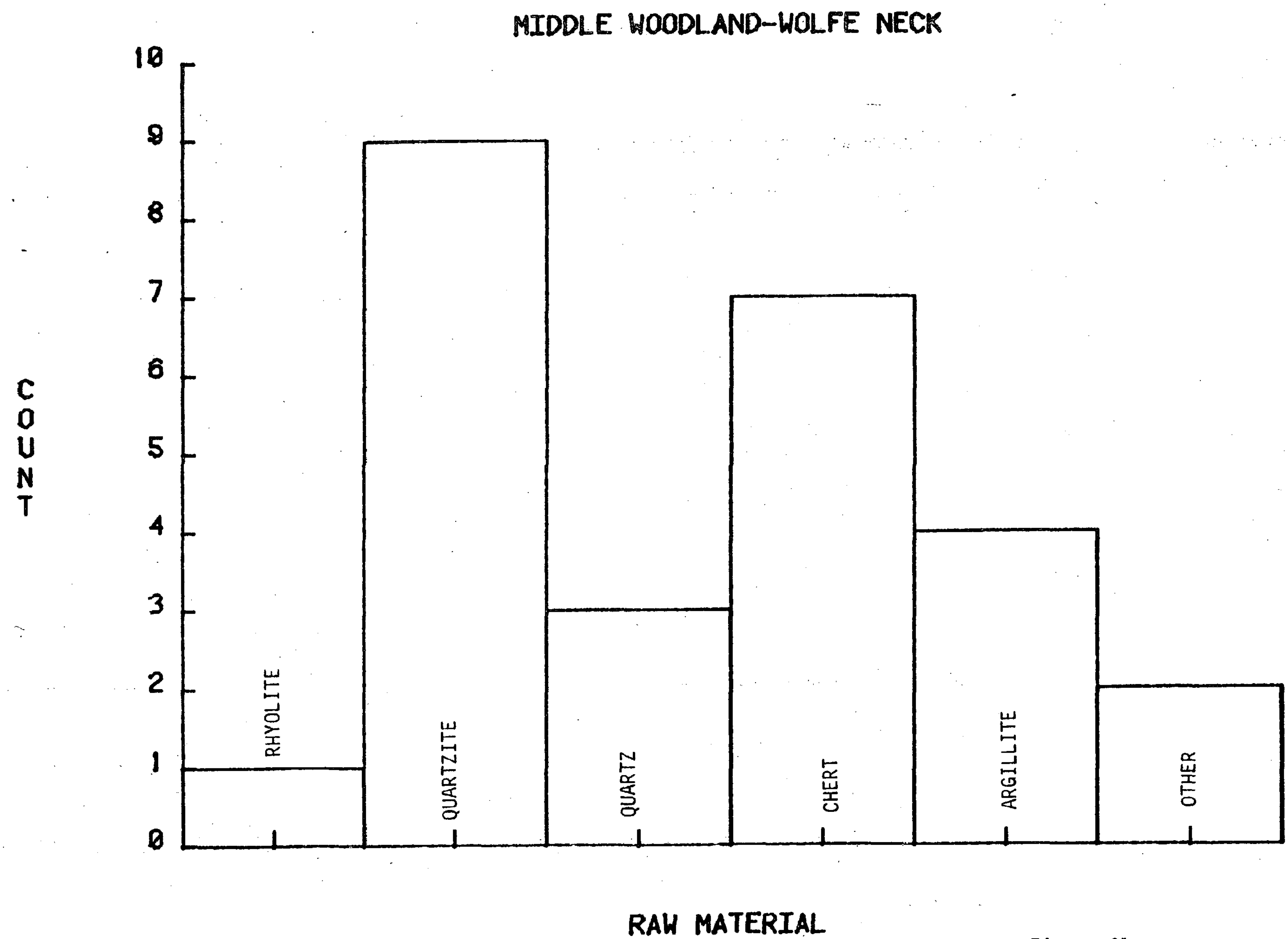

MIDDLE WOODLAND-WOLFE NECK
COUNT
10
9
8
7
6
5
4
3
2
1
0
RHYOLITE
QUARTZITE
QUARTZ
CHERT
ARGILLITE
OTHER
RAW MATERIAL

Figure 61

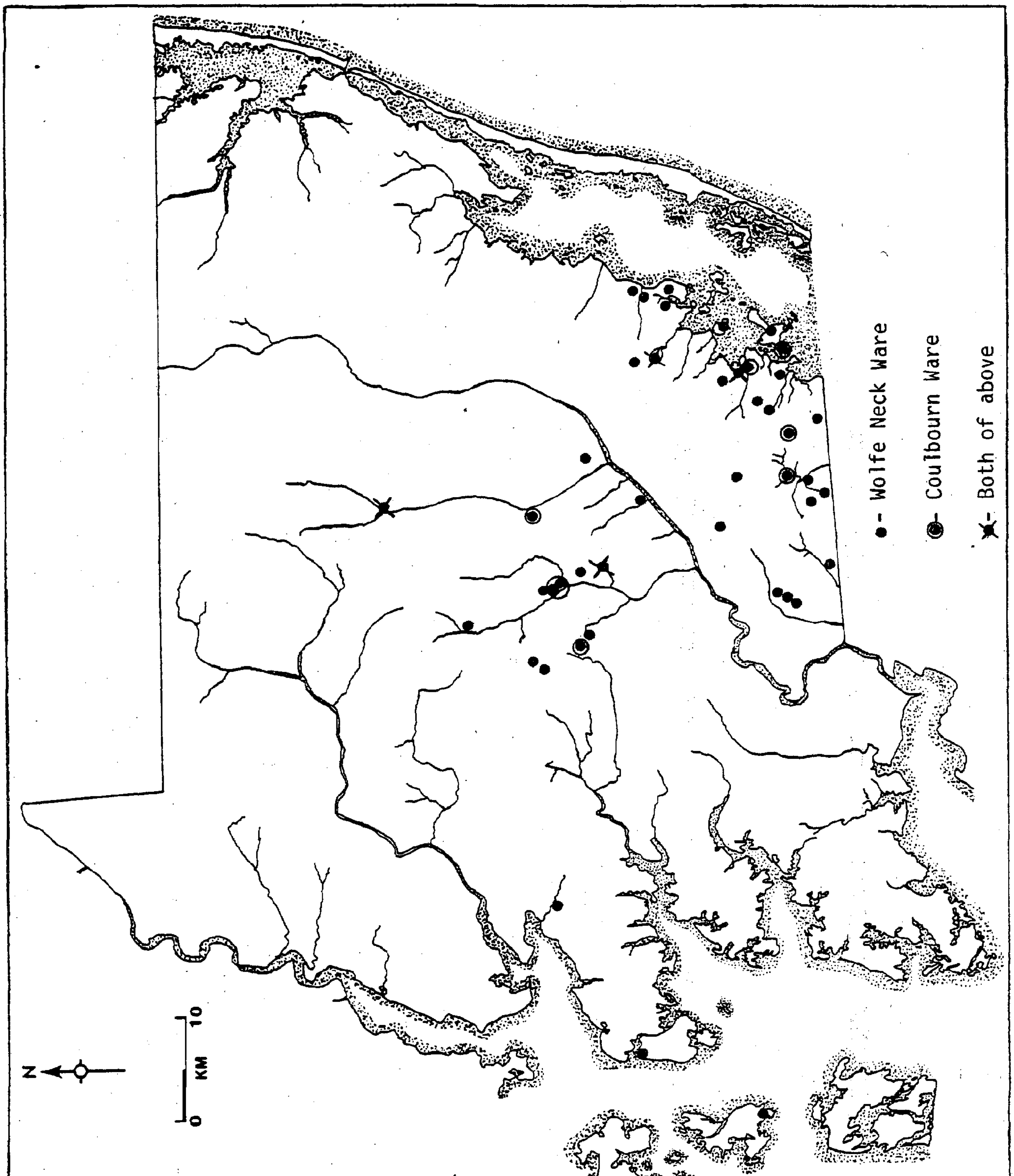


Figure 62 : MIDDLE WOODLAND - WOLFE NECK PHASE

ware being far better represented than the Coulbourn ceramics, although both tend to occur on the same sites.

Lithic raw material use shows a dramatic increase in the use of non-local argillite and rhyolite materials from the previous phase showing renewed contacts with other areas (see Figure 61).

Artusy (1977) notes a strong similarity between Wolfe Neck ware and Accokeek ware found on the Western Shore. A dramatic settlement pattern shift was also noted on the Western Shore associated with Accokeek ware (Steponaitis 1980:96). McNett and Gardner (1971) attribute this settlement shift to an increased use of oysters after the introduction of ceramic vessels. A population increase and increased sedentism is felt to accompany this subsistence shift. Base camps near the estuarine zones with smaller inland hunting camps are postulated. This model has certain problems in its application to the evidence seen within the study area. First, the presence of base camps in estuarine zones where ceramics would be used for the primary purpose of oyster preparation implies that ceramics should occur almost exclusively on these sites. This is not found to be the case as ceramics are present in similar relative frequencies at the inland sites of this phase. Steponaitis (ibid) notes a similar problem with the application of this model to the Patuxent drainage and, additionally, points out that oyster utilization may have occurred for several thousand years before the manufacture of ceramics arose. The presence or absence of shell middens associated with the Wolfe Neck phase sites which were examined during this study could not be determined from the material collected, but a

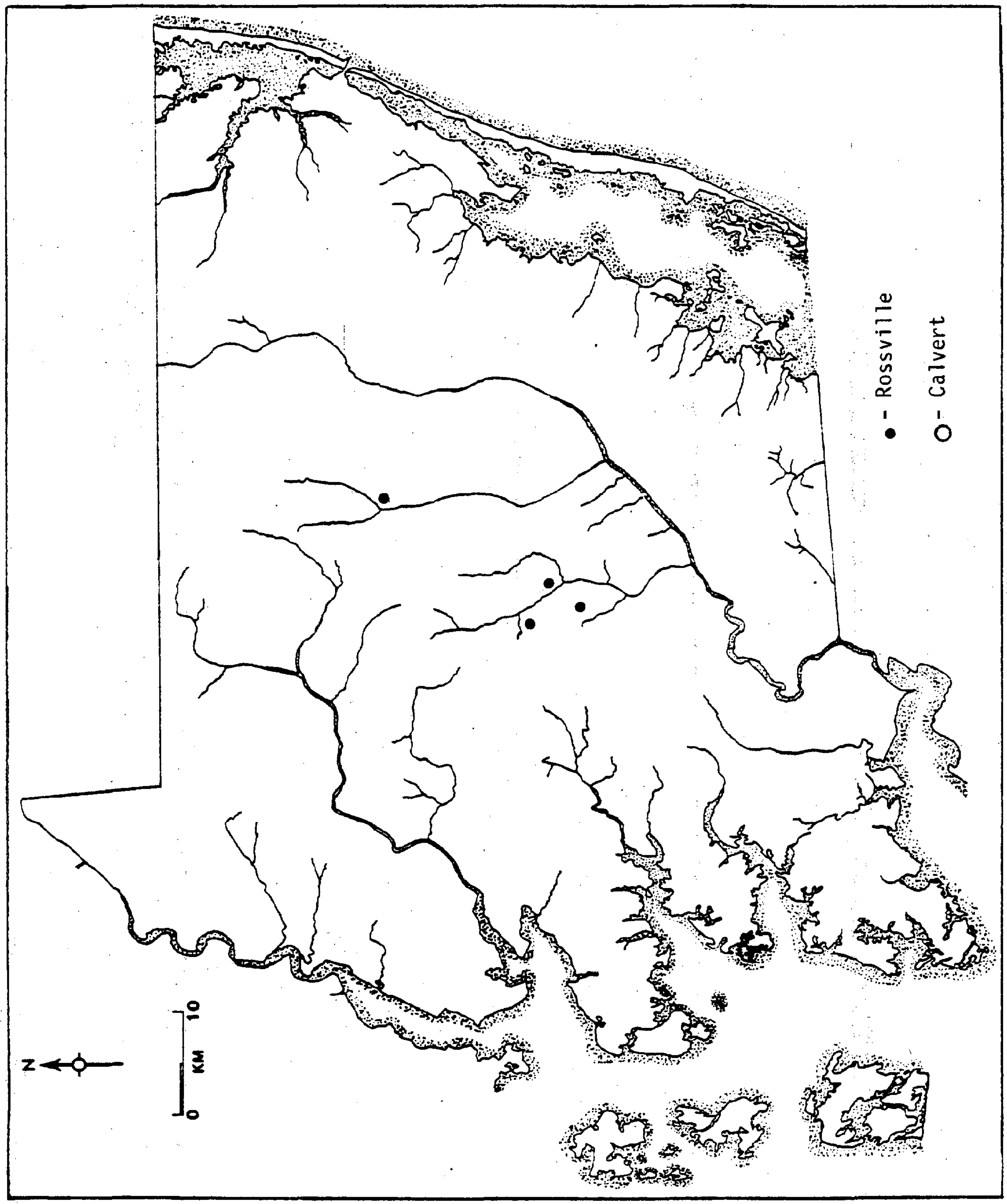


Figure 63 : PROJECTILE POINTS ASSOCIATED WITH WOLFE NECK CERAMICS

number of the sites on the back bay Atlantic coast and islands do have shell associated with them according to the state archaeologist's site survey reports on file in Baltimore. Thus, it would seem that an increase in population and a more sedentary settlement pattern may well characterize the Wolfe Neck phase, but the development of ceramics and oyster exploitation is likely not the sole cause of such adaptive shifts. The settlement pattern which is noted includes sites both inland along secondary streams and near swamps as well as in coastal and estuarine areas (see Figure 62). This site distribution implies increased use of many resources, including oysters, which could be obtained by hunting, gathering, fishing, and most likely by this time, some form of horticulture. No direct evidence of horticultural activities exist within the study area, but the possible presence of such an adaptation should not be ignored. McNett and Gardner (1975) speculate that a decrease in the size of shell middens seen around the end of the Wolfe Neck phase may represent the addition of corn agriculture to the established subsistence strategy.

The Coulbourn Ware which marks the end of the Wolfe Neck phase, and would be associated with the introduction of corn agriculture proposed by McNett and Gardner (ibid), shows a number of similarities to Popes Creek ware which occurs at about the same time on the Western Shore. Both of these ceramic types interrupt the sequence of crushed stone tempered pottery by using a different temper (Griffith and Artusy 1977), Popes Creek using sand and Coulbourn Ware using crushed ceramics or fired clay. A scraped interior attribute is also similar in both wares. A decline in the presence of both Popes Creek Ware and Coulbourn Ware as compared

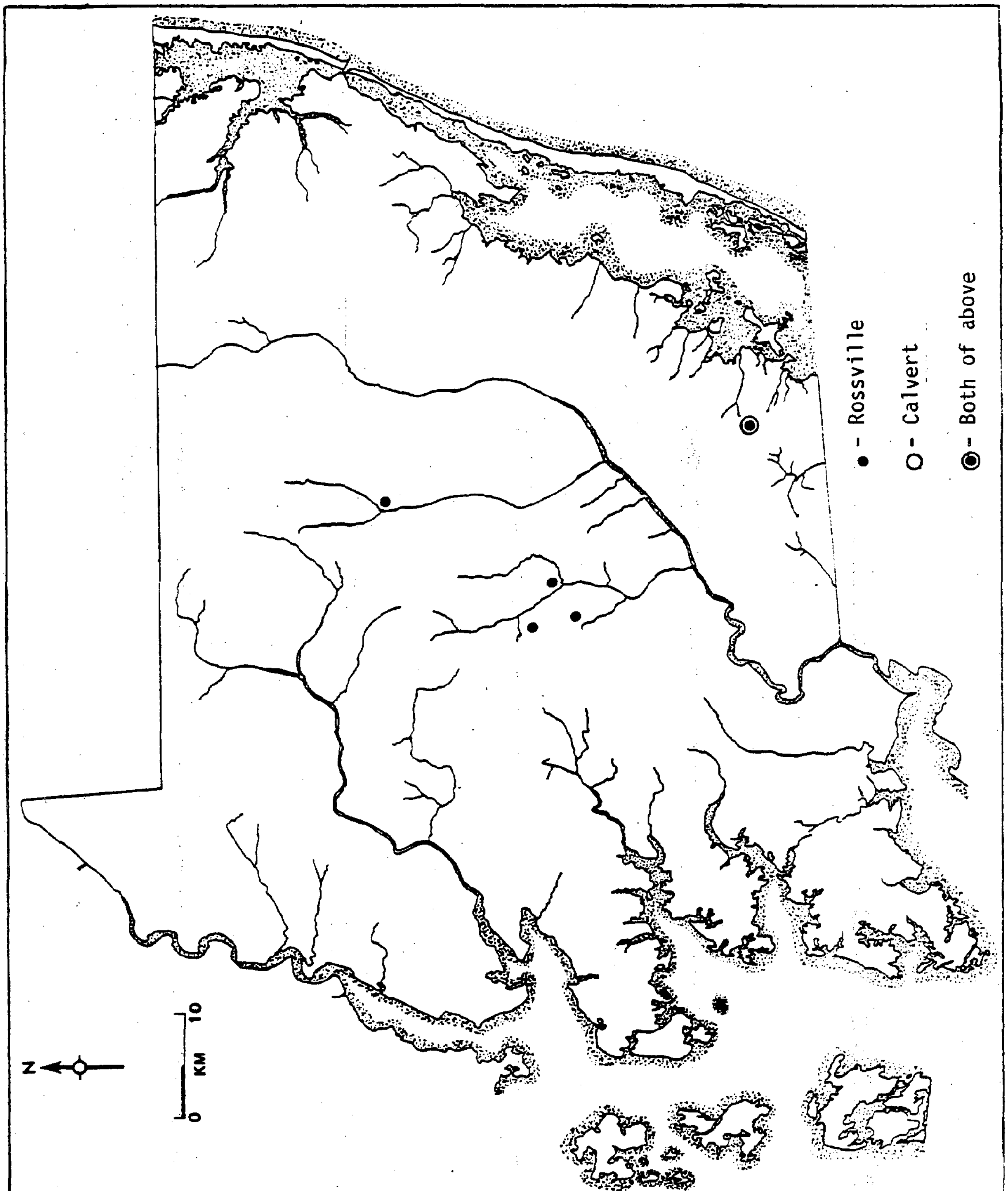


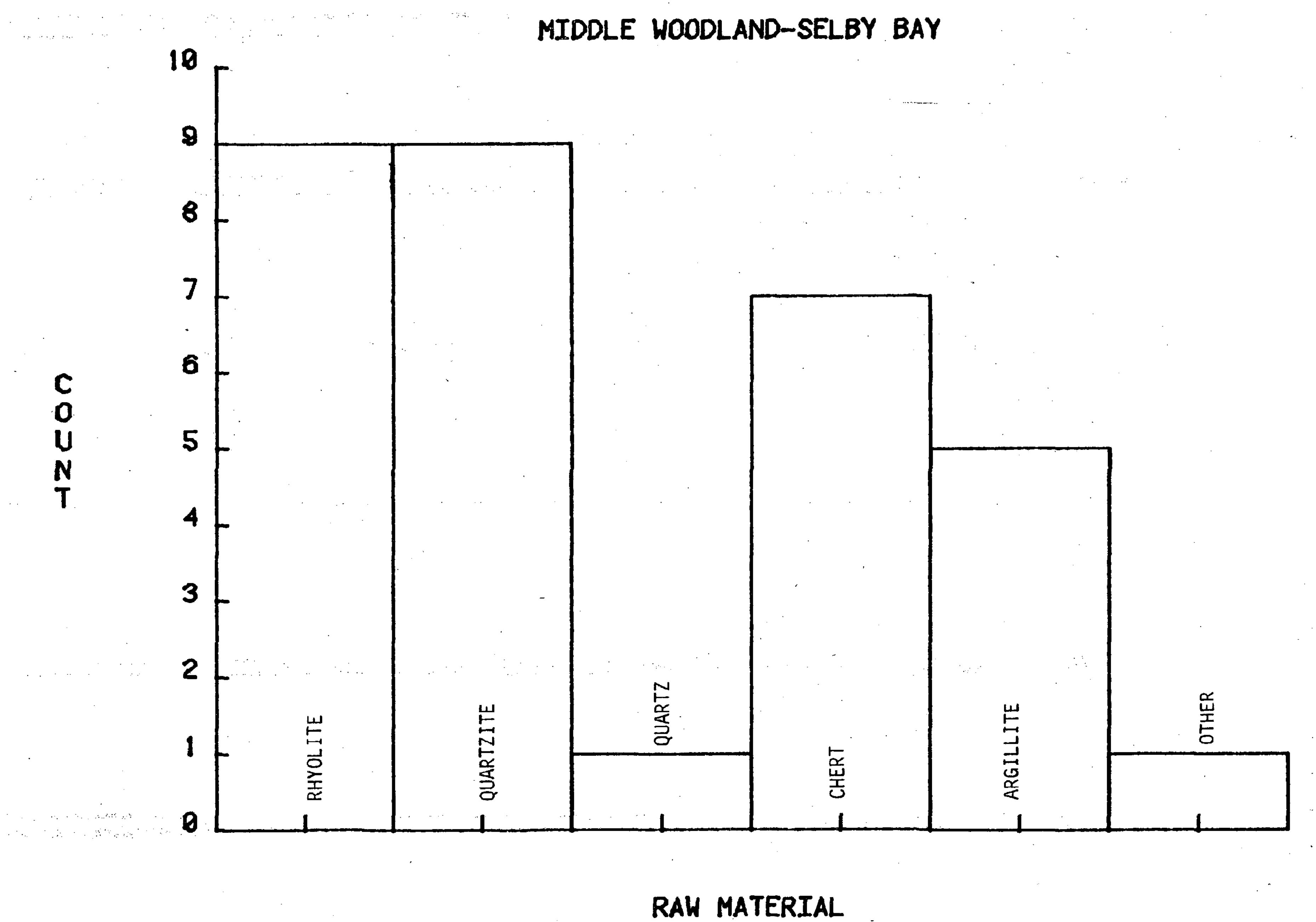
Figure 64 : PROJECTILE POINTS ASSOCIATED WITH COULBOURN CERAMICS

to the earlier crushed quartz ceramic wares is hard to explain. Both the earlier and later types of ceramics tend to occur at the same sites and appear to represent exploitation of the same environmental zones (Artusy 1977). Whether a replacement of peoples has occurred or not is unknown at this point, but the general technological and subsistence patterns seem to indicate that the same group is responsible for both ceramic wares.

Selby Bay Phase:

The Selby Bay Phase (A.D. 110-485) is characterized by the presence of Mockley shell tempered ceramics and Selby Bay (Steubenville, Fox Creek) points. The Badin Point, defined by Coe (1964) may also date to this phase. A high use of non-local rhyolite and argillite occurs in the manufacture of Selby Bay points (see Figure 65). Selby Bay Stemmed points were the most commonly seen variety in the collections examined with the Side-Notched variety being a distant second in quantity and the Lanceolate variety being totally absent. Mayr (1972) reports that three-quarter grooved axes, elliptical two-holed gorgets, stemmed scrapers, bifacially retouched flakes, side scrapers and bone awls are also common during the Selby Bay phase.

The subsistence and settlement patterns of this phase probably revolve around the exploitation of a broad variety of resources in a number of different environments, much like the preceeding Wolfe Neck phase. Excavation reports from sites on the Western Shore (Mayr 1972, Woodward 1969) indicate the presence of deer, oyster, beaver, tortoise, turkey,



MIDDLE WOODLAND-SELBY BAY
COUNT
10
9
8
7
6
5
4
3
2
1
0
RHYOLITE
QUARTZITE
QUARTZ
CHERT
ARGILLITE
OTHER
RAW MATERIAL

FIGURE 65

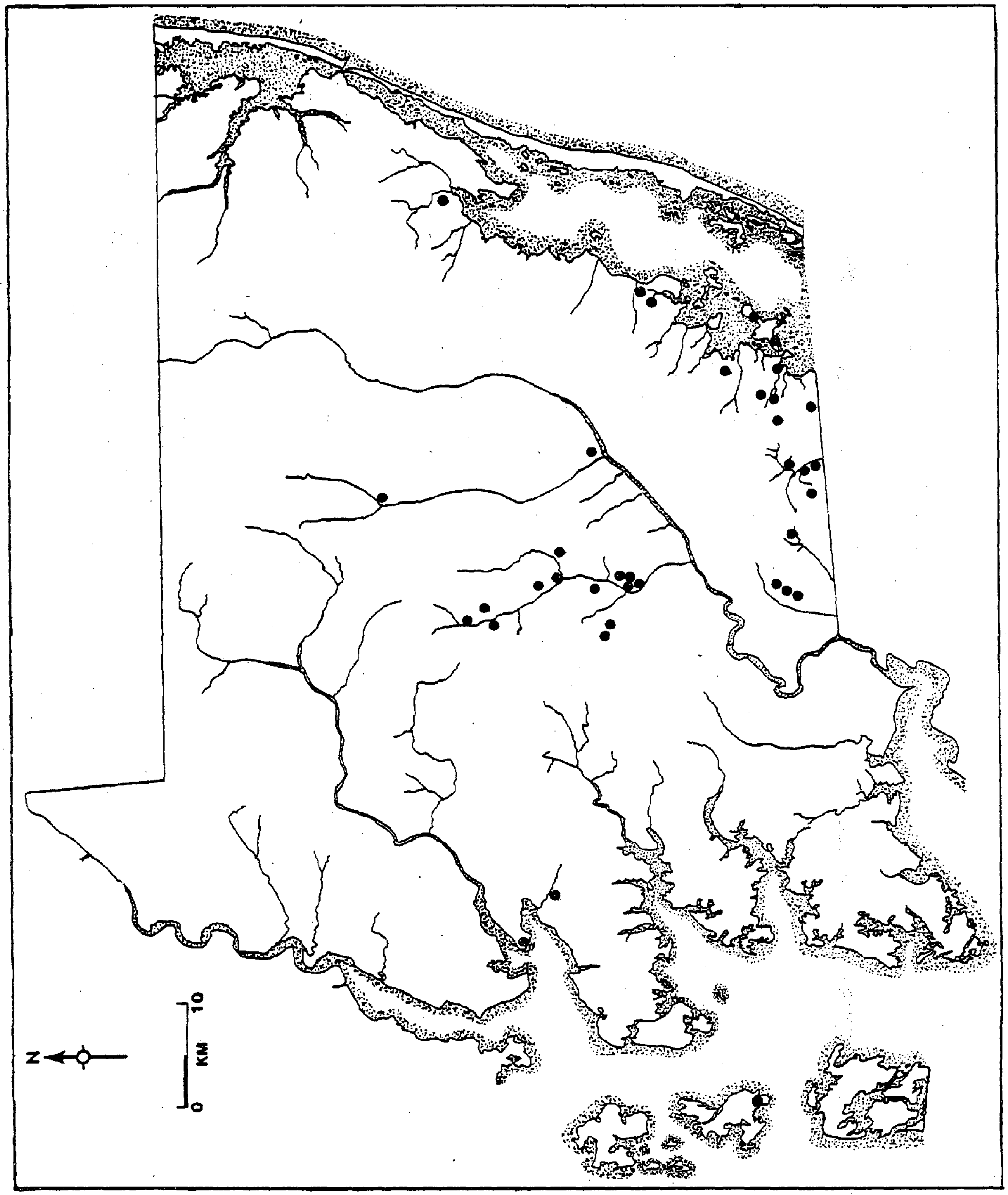


Figure 66 : MIDDLE WOODLAND - SELBY
BAY PHASE

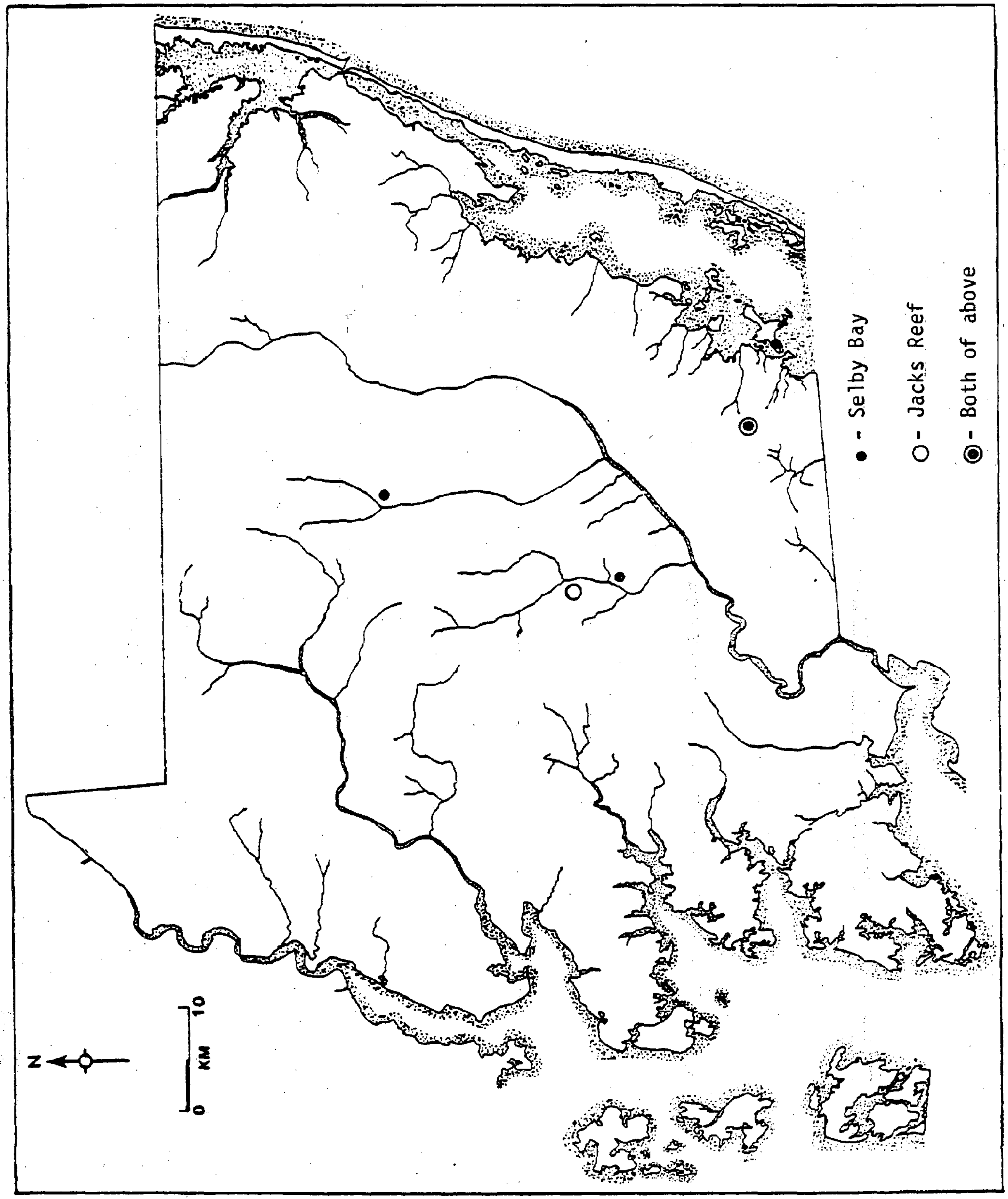


Figure 67 : PROJECTILE POINTS ASSOCIATED
WITH MOCKLEY CERAMICS

sturgeon, razor clam, freshwater mussel and walnut in association with Mockley ceramics. Horticultural resources may also have been exploited to a minor extent at this time, although no evidence as yet exists. The occurrence of Middle Woodland sites on the middle and lower stretches of drainage systems and near salt water bays in Delaware (Thomas 1974) coincides well with the above model and the observed distribution of sites within the study area (see Figure 66). Both Wright (1973) and Handsman and McNett (1974) postulate a shift in settlement pattern from one based on a single large base camp and many smaller camps to one with many large and small camps. They see this occurring as a result of population increase and possibly horticulture. The lack of data on site size prevents testing this model with the study area at this time.

Hell Island Phase:

The Hell Island Phase (A.D. 500 to 1000) is defined by the presence of Hell Island Ware and Jacks Reef points. Levanna points may also occur with Hell Island ware (Thomas et al. 1974) at the end of the phase. Hell Island Ware represents a clear technological change from the preceeding Mockley ceramics. The paste characteristics and tempering material are very different. Hell Island Ware is common in Delaware and appears to be related to such northern ceramic types as Jacks Reef Corded, Levanna Cord-on-Cord and Riggins Fabric Impressed ceramics (Artusy 1977). This may imply some sort of intrusion or influence from the north.

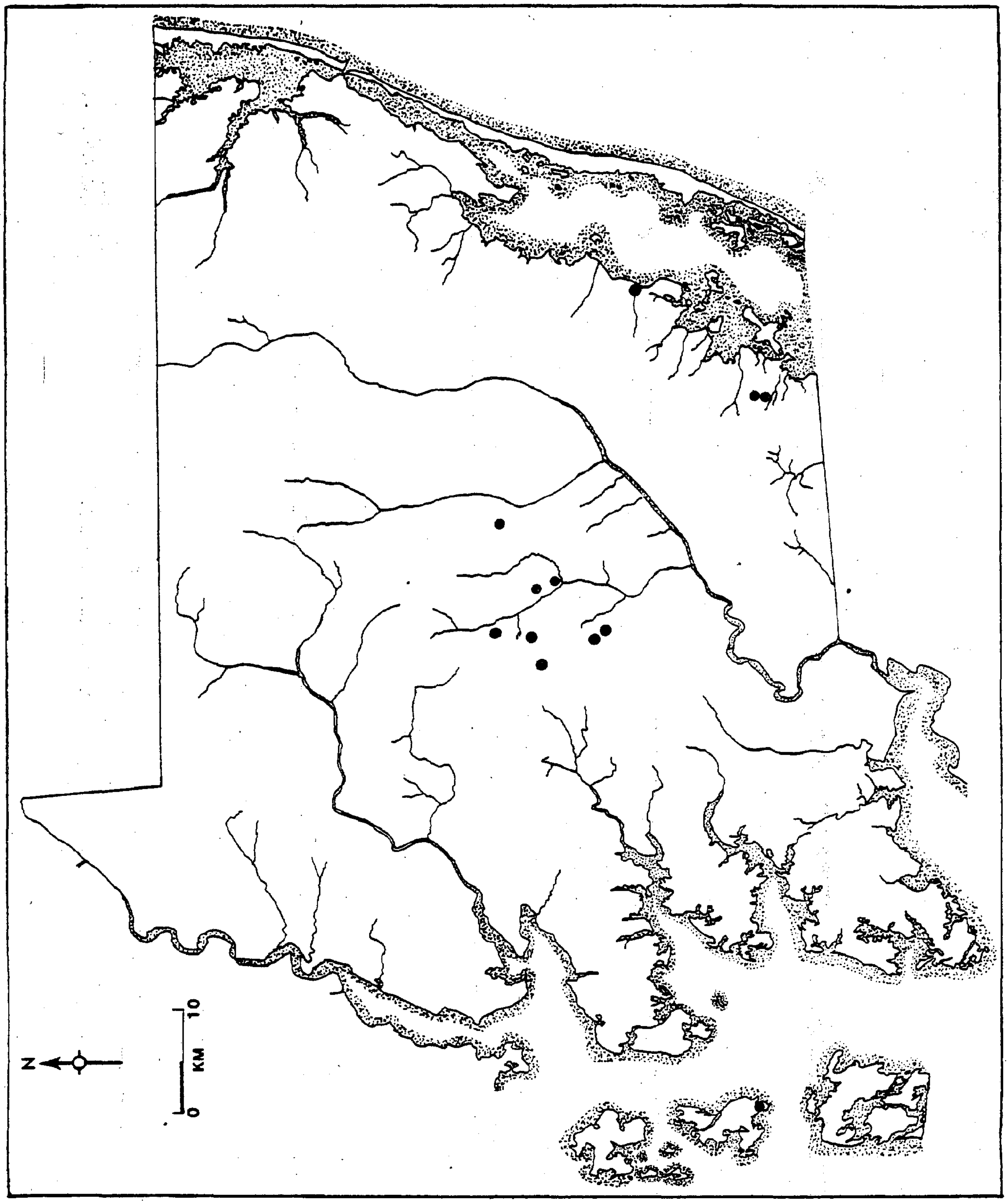


Figure 68 : MIDDLE WOODLAND - HELL ISLAND PHASE

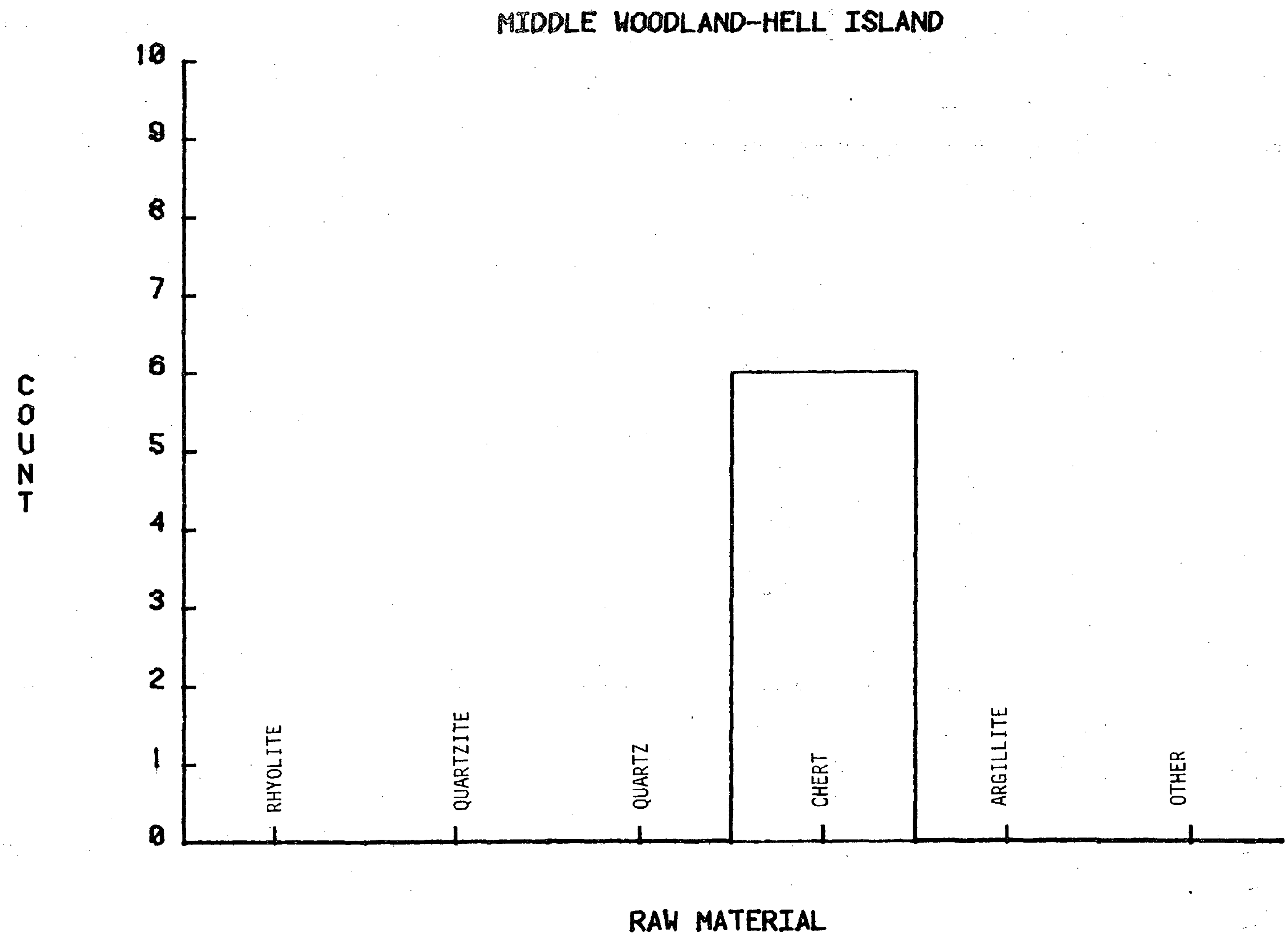

MIDDLE WOODLAND-HELL ISLAND
COUNT
10
9
8
7
6
5
4
3
2
1
0
RHYOLITE
QUARTZITE
QUARTZ
CHERT
ARGILLITE
OTHER
RAW MATERIAL

FIGURE 69

The site distribution pattern of the Hell Island phase (see Figure 68) shows a marked drop in the number of sites within the study area. The sites that are present are concentrated around the upper and middle reaches of secondary streams, but a few sites also occur in both the Atlantic and Chesapeake Bay areas. Lithic raw material used for points at these sites consisted solely of cherts (see Figure 69), indicating a very different raw material utilization pattern from the previous phase. Hell Island Ware was found at the Island Field site in Delaware associated with Jacks Reef points, so it seems to have a possible relation to the ceremonial aspects associated with the ill-defined Oxford and Webb Phases in Delaware (Thomas and Warren 1970). The ceremonial influences noted at the Island Field site are thought to result from interaction with the Hopewellian interaction sphere to the west of Maryland in the area of Ohio and beyond. If this is so, one could expect to find ceremonially related artifacts within the study area at sites where Hell Island phase material is present, but no such material was noted within the collections studied.

Whether these artifacts represent an actual intrusion of Hell Island using peoples into the study area or are the result of trade and influence from the north is unknown. However, from the site distribution evidence at hand it appears the settlement and subsistence pattern of this phase changed little from the previous one. Systematic survey and excavation is needed to clarify the relation of this phase to the preceeding and following phases.

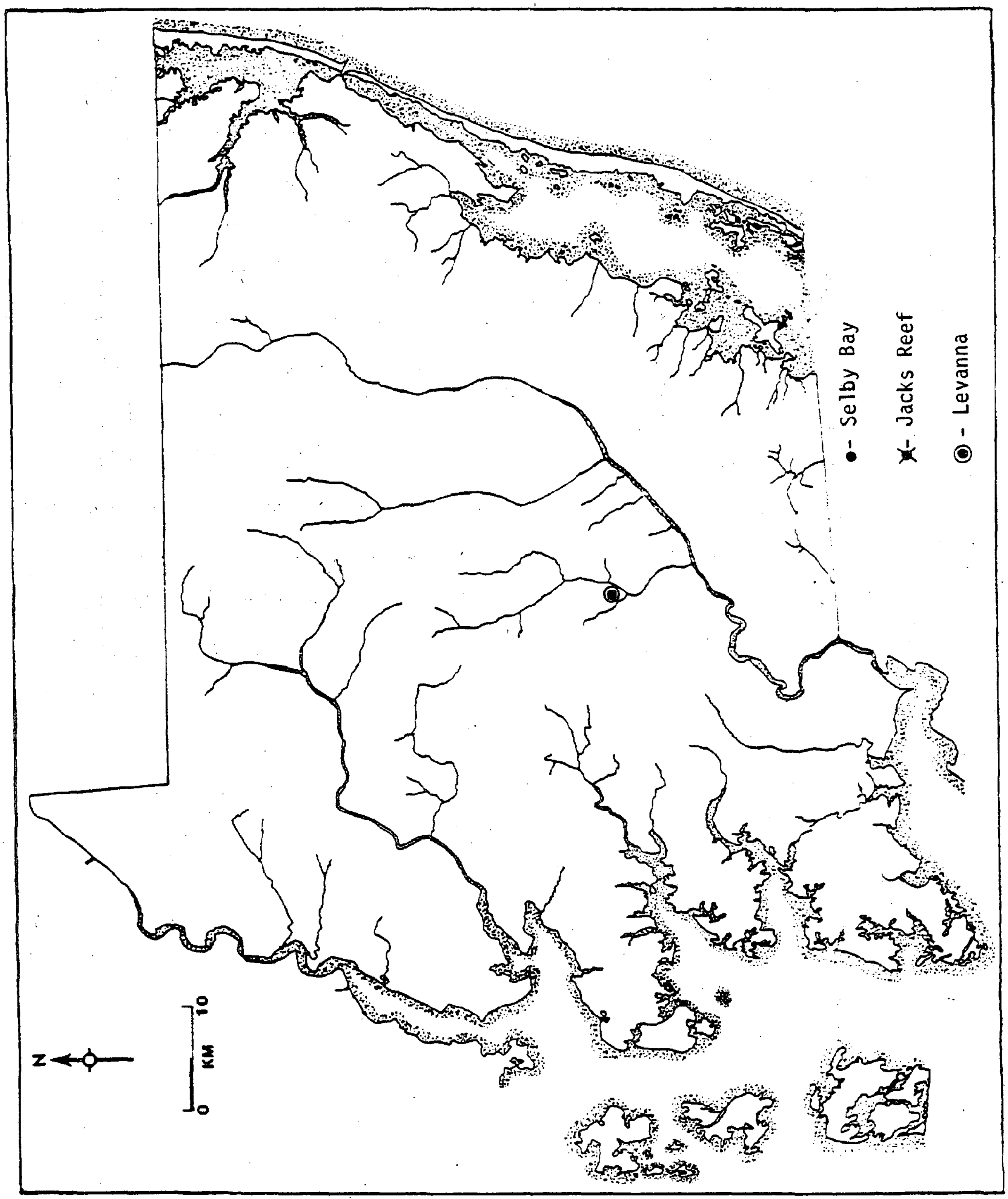


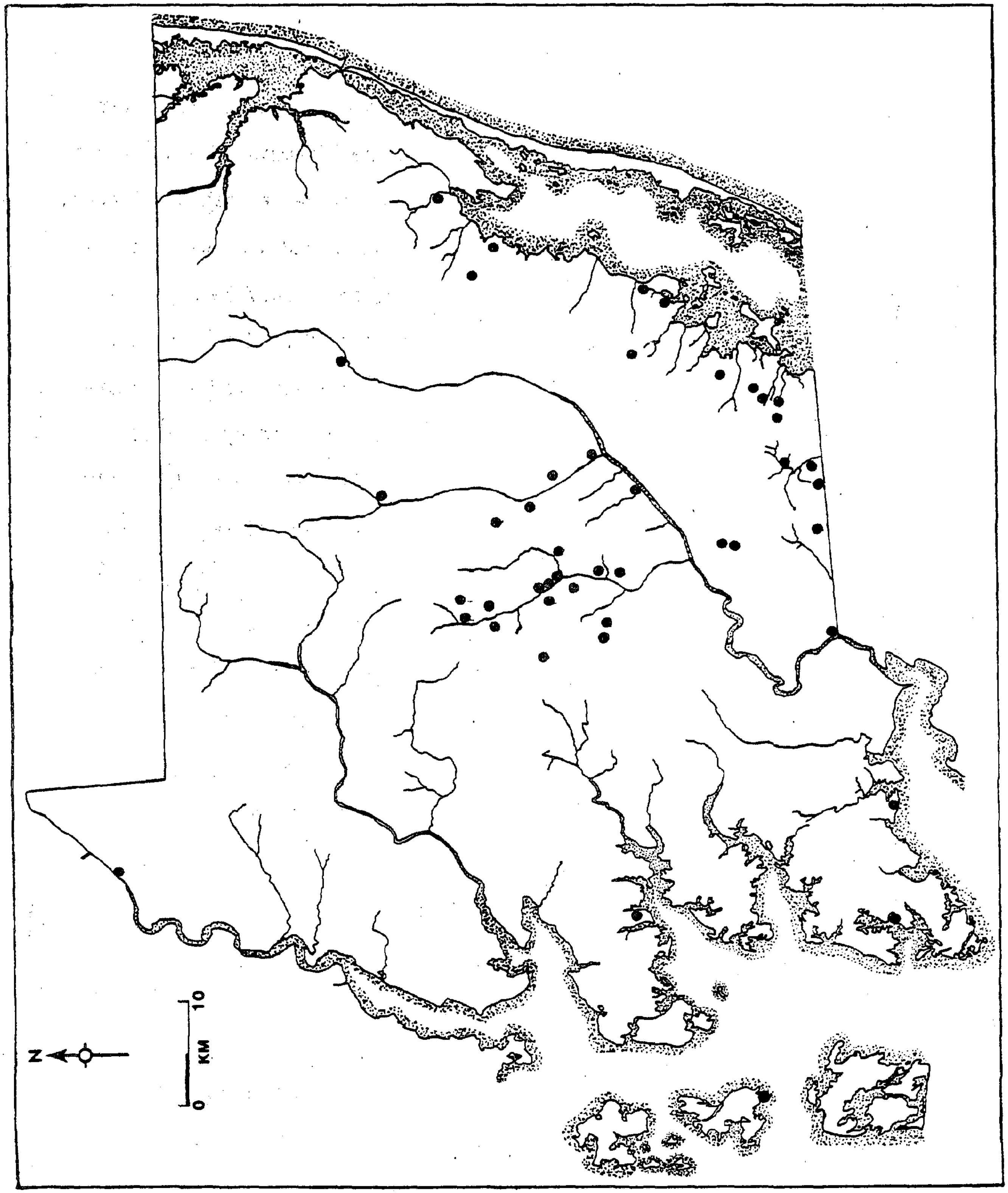
Figure 70 : PROJECTILE POINTS ASSOCIATED
WITH HELL ISLAND CERAMICS

LATE WOODLAND PERIOD

The Late Woodland Period (A.D. 1000 to European Contact) is characterized by a number of significant changes in the lifeways of populations in the eastern United States. Corn agriculture, large palisaded villages, deep middens, permanent structures including houses and storage pits, items of personal adornment and the first evidence of warfare all have been listed as characteristics of the Late Woodland Period in the eastern half of North America. It is felt that all of these traits indicate an increased sedentism and population growth, accompanied by increased isolation of cultural groups. None of these traits has been adequately documented for the study area, but some preliminary aerial reconaissance (see Appendix II) seems to show areas which look very much like the palisaded villages known from other areas. Such villages were present by the time of European contact, so their appearance within the study area is expected. The initial part of the Late Woodland period is marked by the presence of shell tempered ceramics known as the Townsend Series (Griffith 1977, 1980). These ceramics occur across the coastal plain and on the Delmarva Peninsula as far north as Dover, Delaware (ibid).

Little Round Bay Phase:

The Little Round Bay Phase (A.D. 1000-1300) is identified by the presence of three ceramic types of the Townsend Incised Series: Rappahannock Incised (complex motif), Townsend Herringbone and Rappahannock



Fiure 71 : LATE WOODLAND - TOTAL SITES

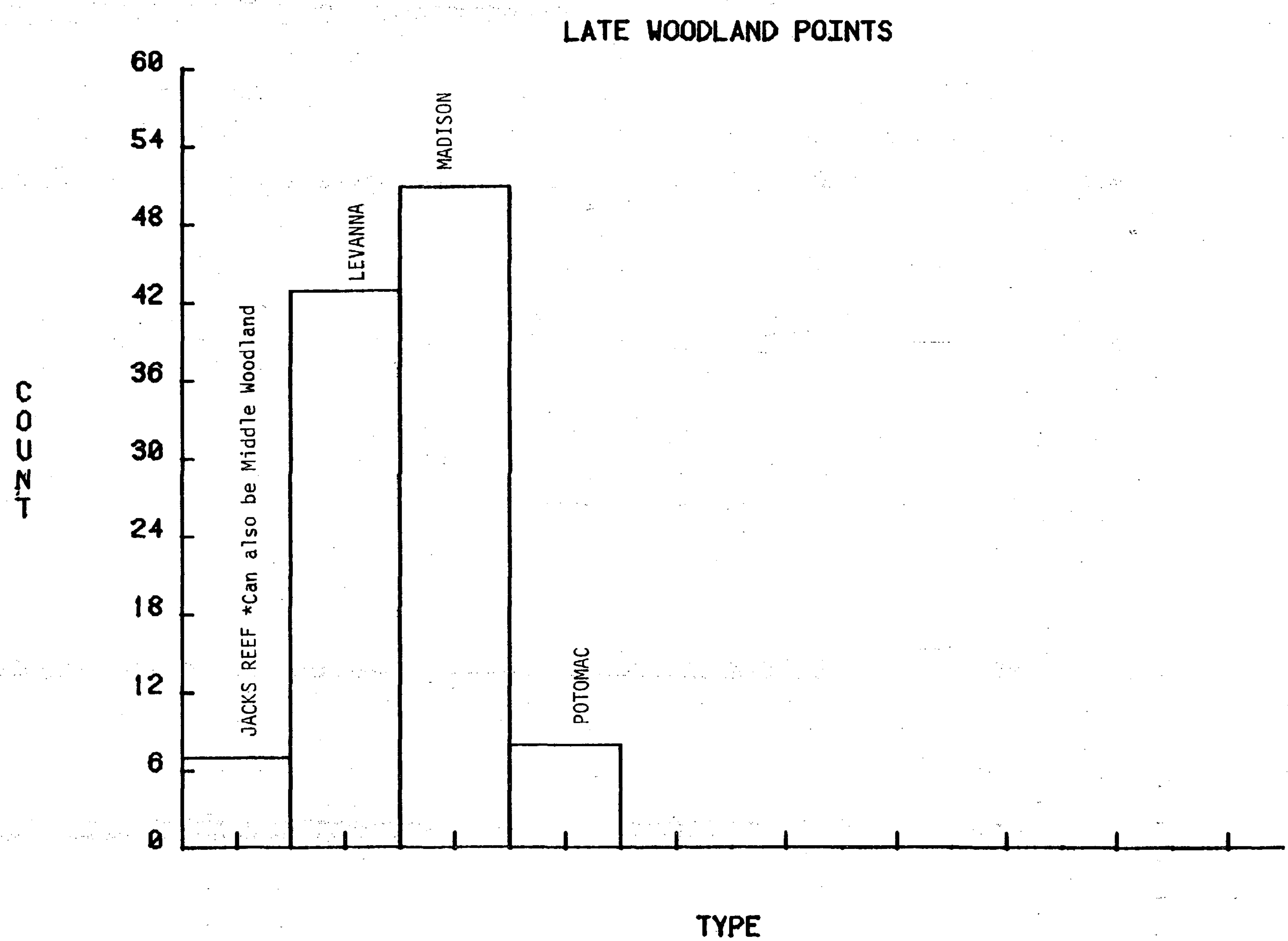

LATE WOODLAND POINTS
COUNT
60
54
48
42
36
30
24
18
12
6
0
JACKS REEF *Can also be Middle Woodland
LEVANNA
MADISON
POTOMAC
TYPE

FIGURE 72

Fabric Impressed. The type Rappahannock Fabric Impressed was not used to identify components of this phase due to its continued occurrence in the later Sullivan Cove Phase. The decorative techniques used on these ceramics were based upon either direct corded or pseudo-corded (cord wrapped stick) impressions, incising or fabric impressing (Griffith 1980:27). These techniques were combined into design elements of horizontal bands, triangles, rectangles and squares, zig-zags (herringbone), discrete lines or curvilinear lines (ibid:28). The projectile point type associated most strongly with these ceramic types within the study area is the Levanna Triangular point. These points are first noted in the preceeding Hell Island Middle Woodland phase associated with Jacks Reef points, but seem to have "become (more) common" than the latter by the end of the Middle Woodland period (Ritchie 1961:31). Levanna points are quite common within the study area, being most commonly made from chert with argillite and quartz occurring with diminished frequency (see Figure 73). No occurrence of the use of rhyolite was noted within the study area which differs from the observed pattern in the Patuxent drainage where rhyolite was the most common raw material (Steponaitis 1980: 105). Other stone tools associated with this phase at the Mispillion site in Delaware include bifaces, hammerstones, unifacially and bifacially retouched flakes and scrapers (Thomas and Warren 1970b:6). Bone and antler artifacts recovered in Delaware include awls, needles and lithic retouching tools (ibid). It should be noted that in northern Delaware no shell-tempered ceramics are found (Griffith 1977), instead the northern Riggins and Overpeck ceramics occur. Griffith (ibid) suggests that the southern Townsend Ware using groups were the peoples which the Euro-

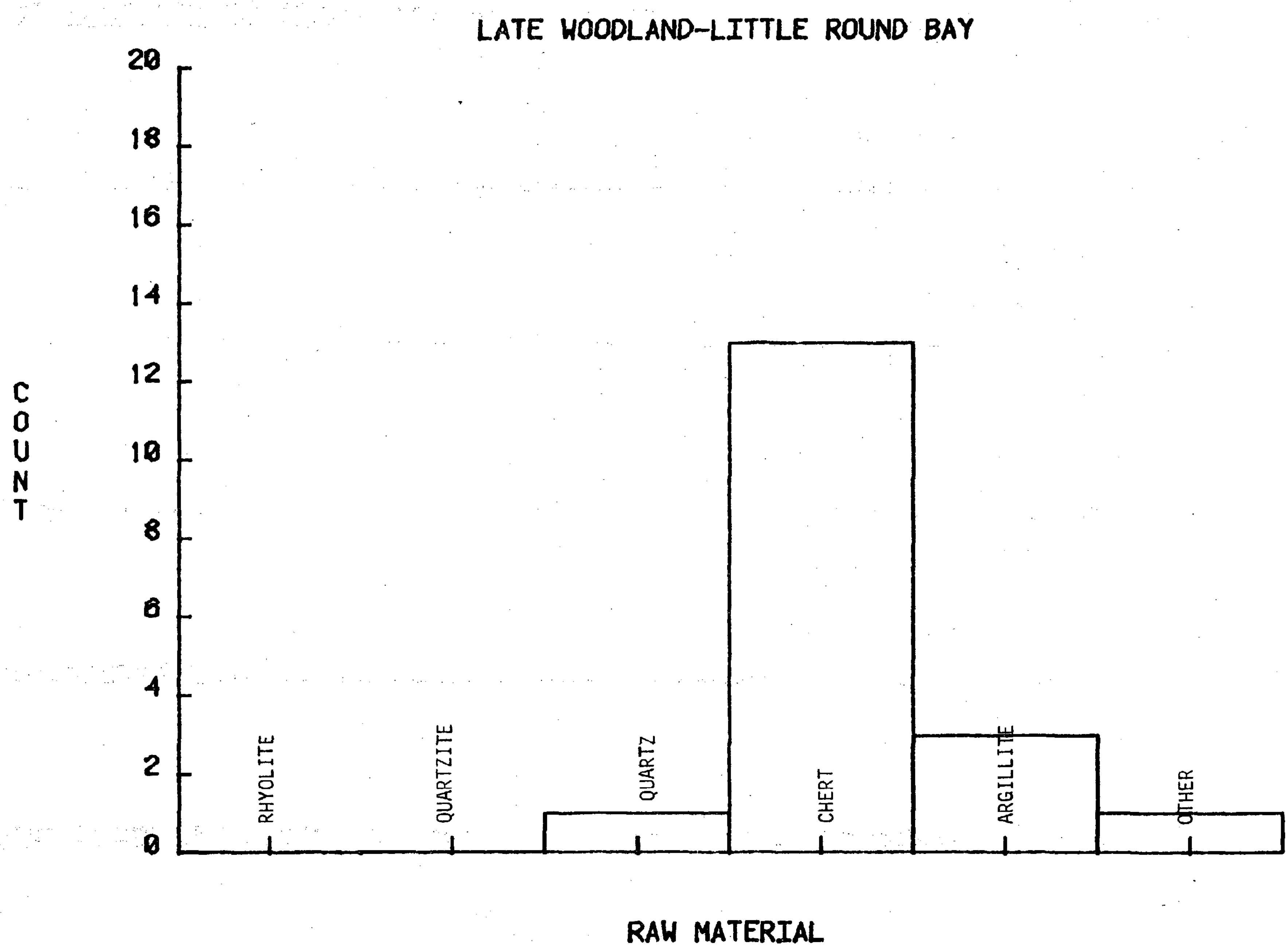

LATE WOODLAND-LITTLE ROUND BAY
COUNT
20
18
16
14
12
10
8
6
4
2
0
RHYOLITE
QUARTZITE
QUARTZ
CHERT
ARGILLITE
OTHER
RAW MATERIAL

FIGURE 73

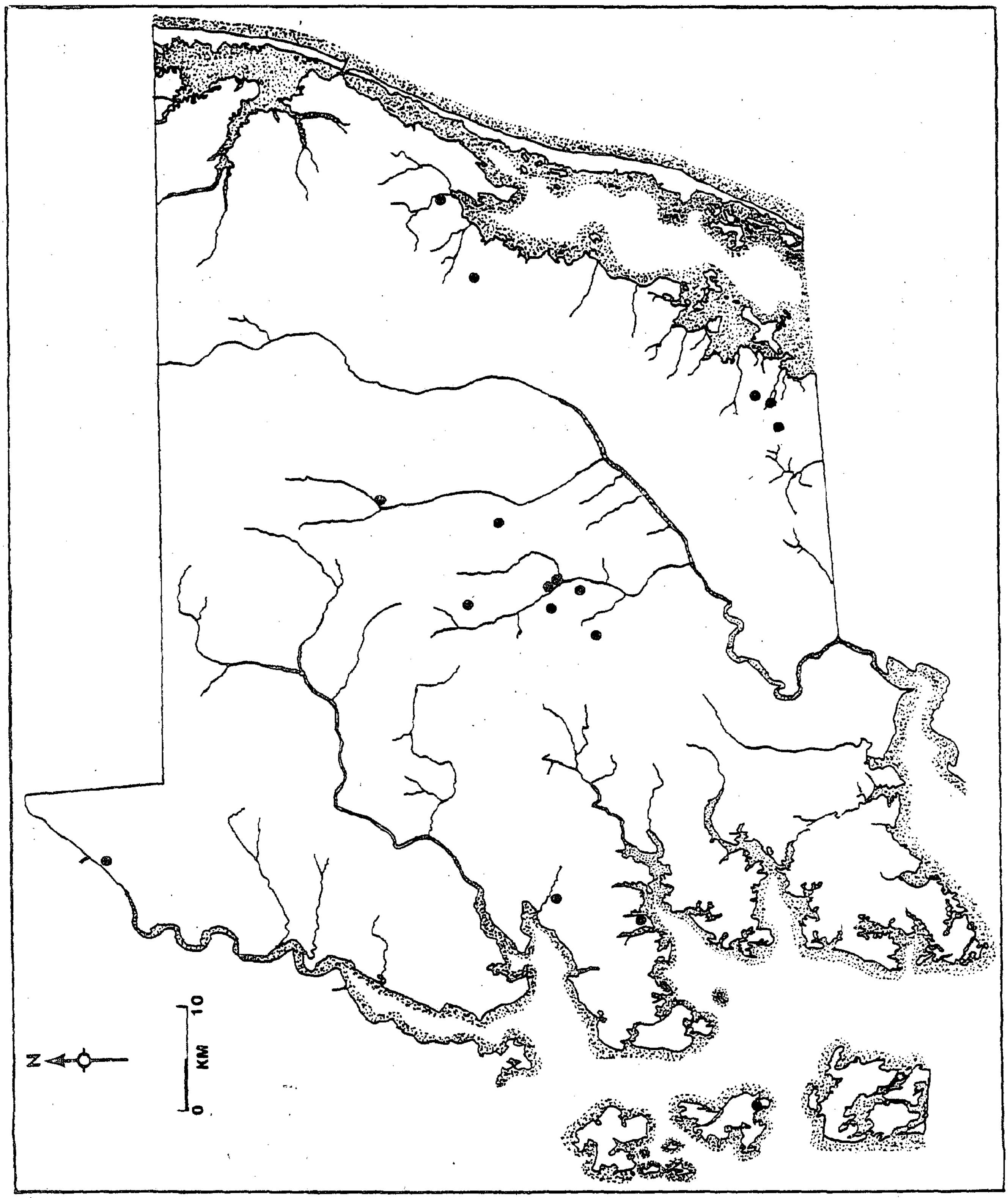


Figure 74 : LATE WOODLAND - LITTLE ROUND
BAY PHASE

peans identified as the Nanticokes and associated groups, while the Riggins and Overpeck users are thought to be the ancestors of the Delaware. Griffith further sees the existence of a buffer zone across the middle Delmarva Peninsula where only transient groups of the northern and southern peoples ventured. At the end of the Little Round Bay phase, a new influence from the west began to appear among Townsend ceramic using peoples. This influence, defined on the Western Shore as the Potomac Creek phase (Stephenson 1963), manifested itself in the acceptance of cord impressed design techniques instead of incising (Griffith 1980:36). In the study area, Townsend Herringbone ceramics exhibit both incised and corded decorative techniques, probably representing a transitional period between exclusive use of incised decoration and its replacement by corded decoration. Townsend Herringbone is poorly represented within the study area. It appears that the acceptance of the Potomac Creek techniques varied from "refuges" where the incised tradition continued, to areas where both traditions occur simultaneously, to sites where corded design is the sole technique present (Clark 1976). The appearance of western originating Potomac Creek influence with the study area signifies a break in the previously noted northern influences which were at work during earlier phases. Within the study area a large number of sites on the next phase (the Sullivan Cove phase) show a high percentage of cord decorated Townsend ceramics signifying probable strong western influences. Thus, a strong influence originating on the Western Shore of the Chesapeake Bay may be seen to have begun to intrude into the existing cultural repertoire by at least the end of the Little Round Bay Phase.

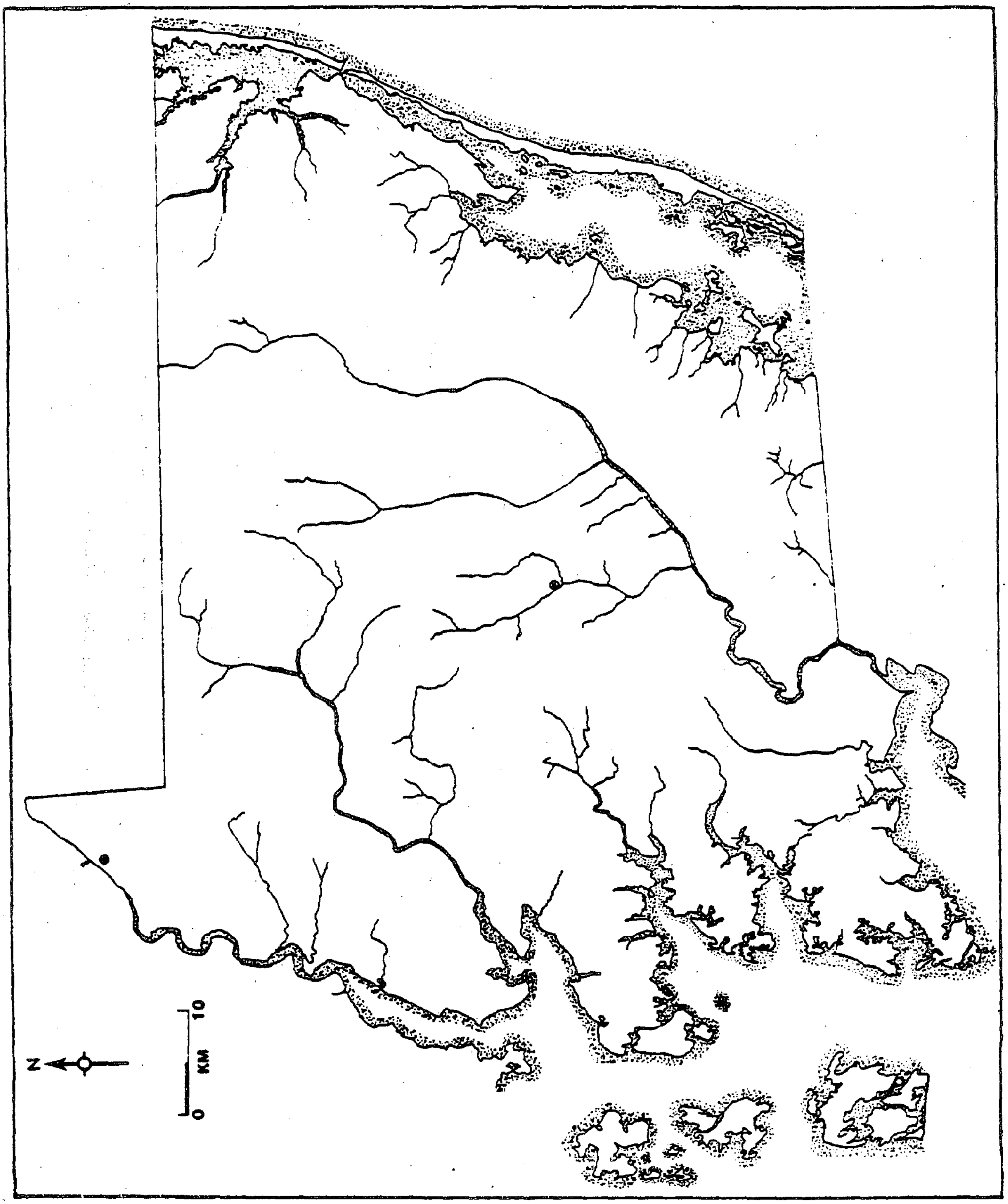


Figure 75 : DISTRIBUTION OF TOWNSEND HERRINGBONE CERAMICS

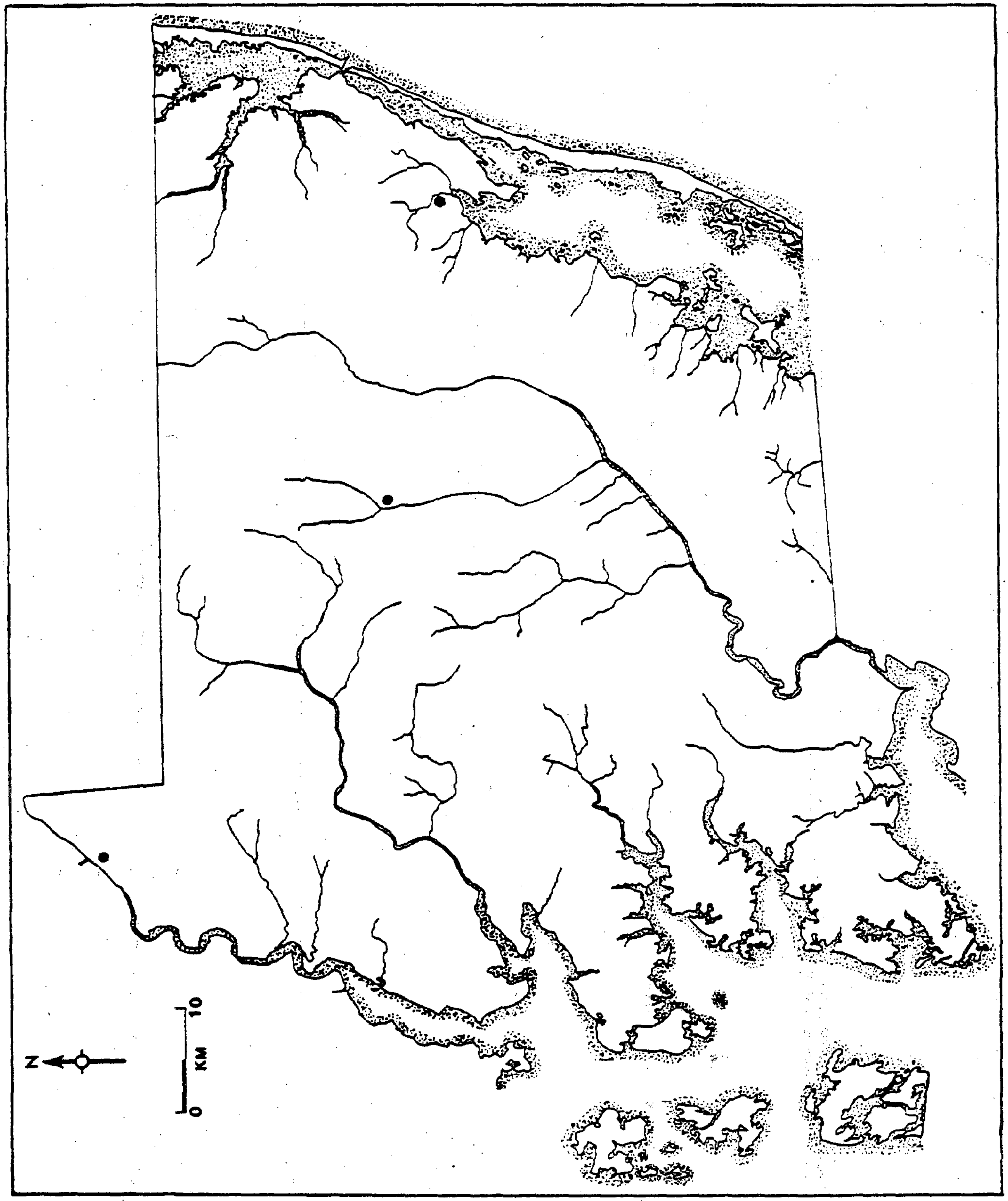


Figure 76 : DISTRIBUTION OF RAPPAHANNOCK
INCISED (complex motif) CERAMICS

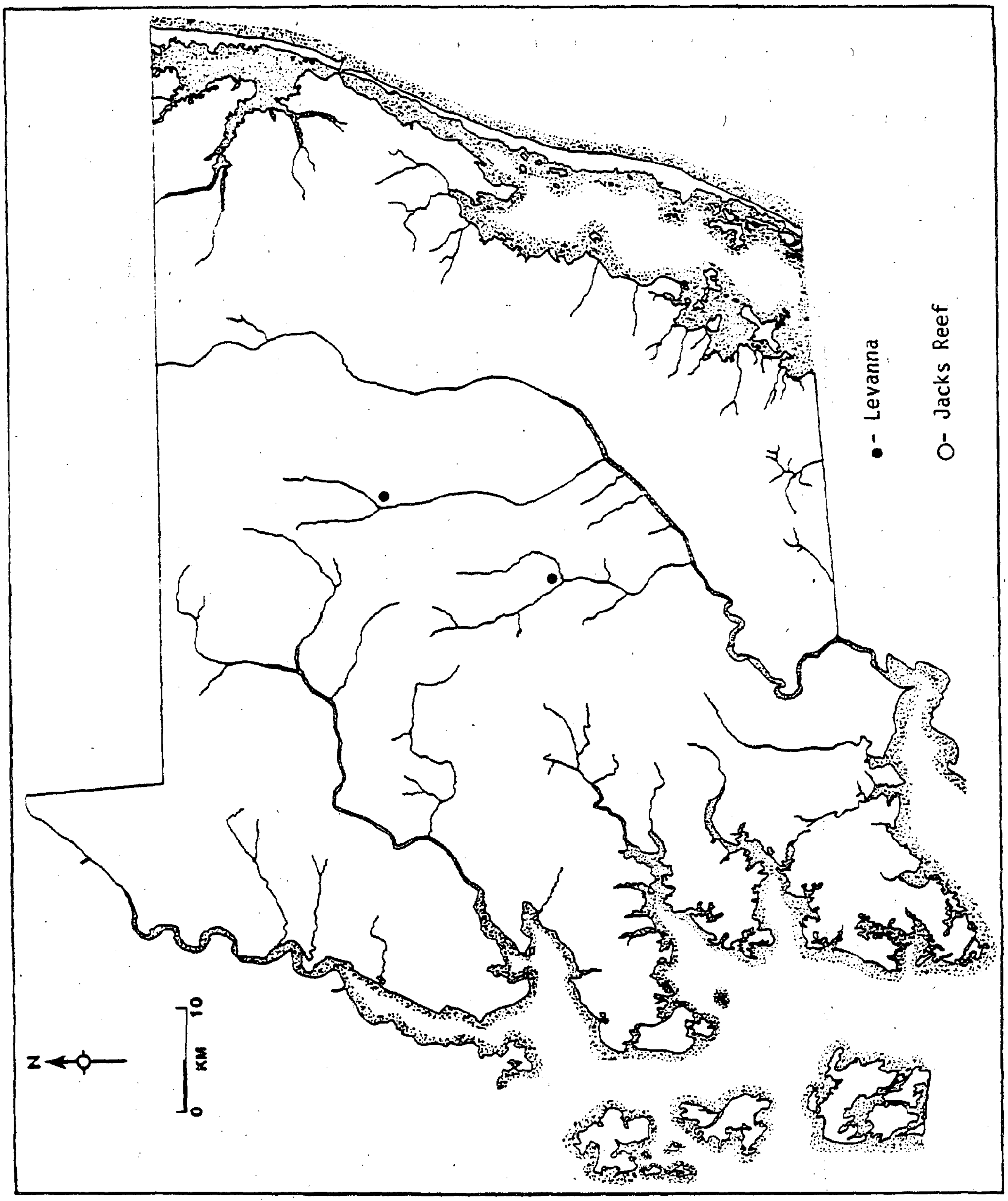


Figure 77 : PROJECTILE POINTS ASSOCIATED
WITH TOWNSEND INCISED SERIES
CERAMICS

The distribution of Little Round Bay Phase sites (see Figure 74) shows little real change from the preceeding Hell Island Phase of the Middle Woodland. A slight rise in the number of more northerly sites is seen, but overall the same pattern of exploitation of diverse environmental zones is noted. During this period in the rest of the Eastern Woodland culture area of the eastern United States, a rising reliance on the cultivation of such crops as corn, beans and squash has been archaeologically documented. While no direct evidence for agriculture yet exists on the Eastern Shore of Maryland, it is likely that at least some agriculture was being practiced by this time. It is probable that a seasonal round of exploiting various environmental zones continued, but a growing dependence on cultigens grown during the spring and summer was probably arising in combination with a continued dependence on shellfish in particular.

Sullivan Cove Phase and Potomac Creek:

The Sullivan Cove Phase (A.D. 1300 to Contact) is one in which the differing ceramic decorative techniques show continued evidence of external influences working upon the study area. The ceramics which mark this phase belong to the Townsend Corded Series and include Rappahannock Fabric Impressed (not used here as a temporal marker due to its occurrence in the previous phase as well), Rappahannock Incised (horizontal motif), Townsend Corded Horizontal and Sullivan Ware.

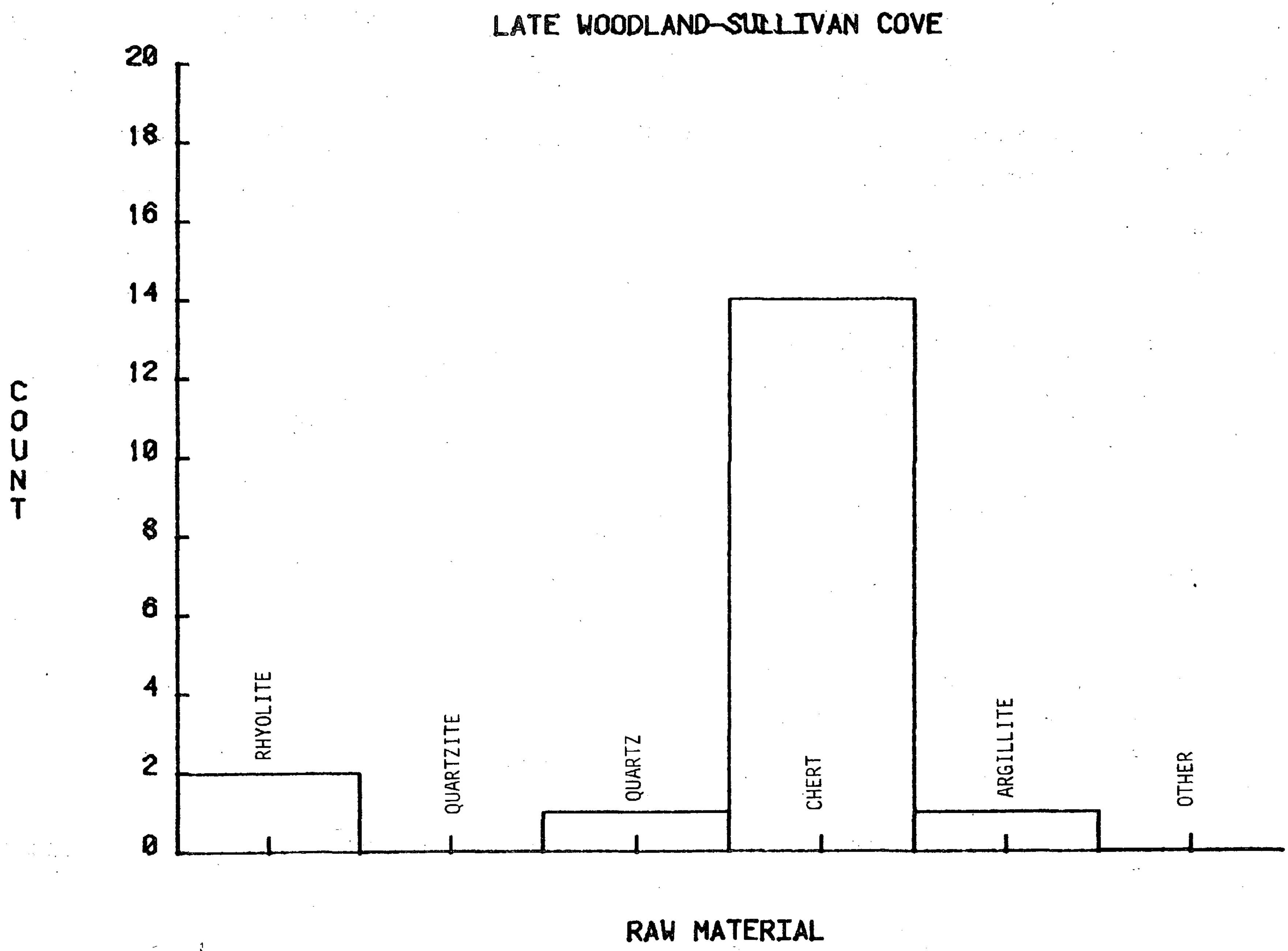

LATE WOODLAND-SULLIVAN COVE
COUNT
0
2
4
6
8
10
12
14
16
18
20
RHYOLITE
QUARTZITE
QUARTZ
CHERT
ARGILLITE
OTHER
RAW MATERIAL

FIGURE 78

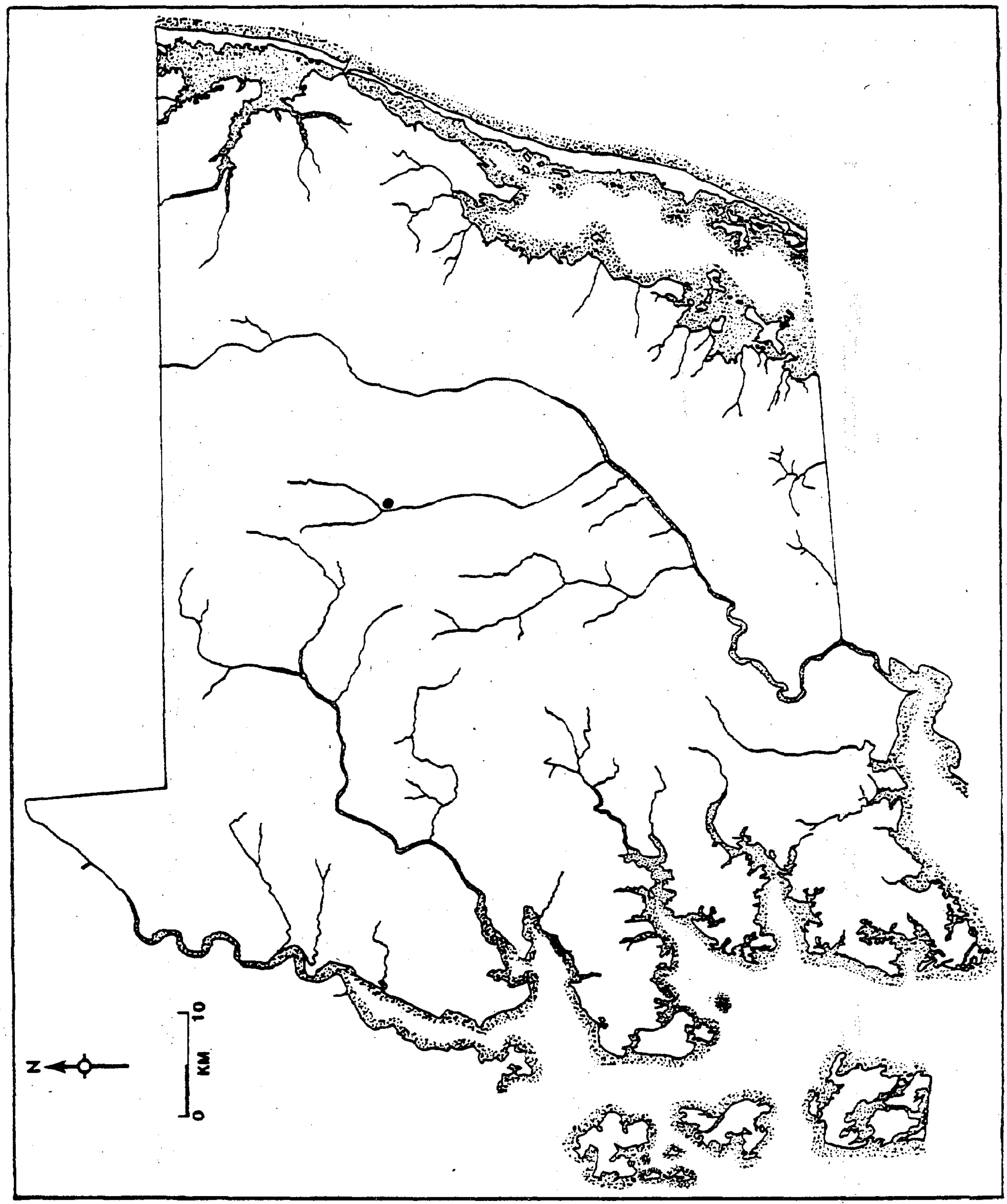


Figure 79 : DISTRIBUTION OF RAPPAHANNOCK INCISED (horizontal motif) CERAMICS

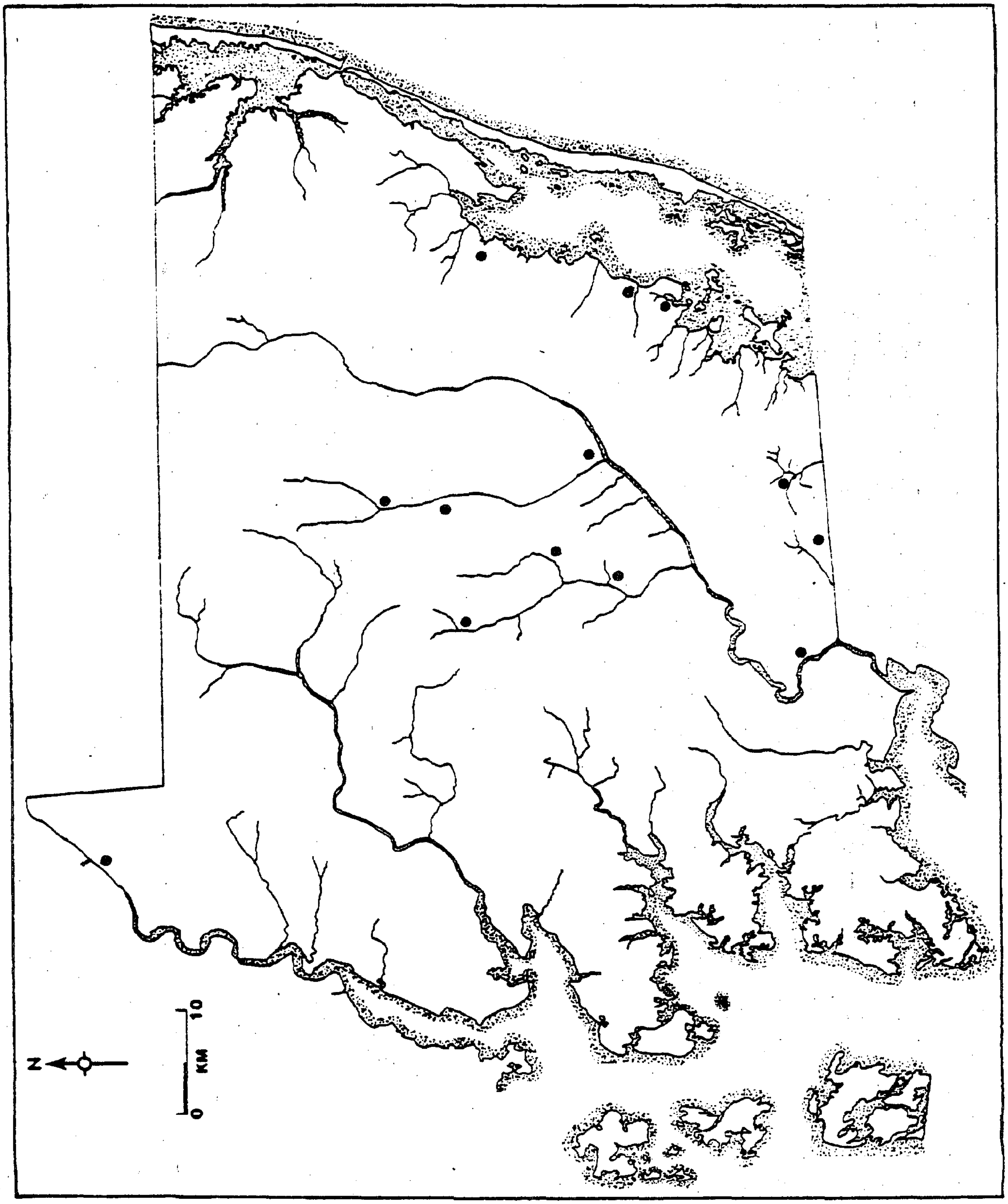


Figure 80 : DISTRIBUTION OF TOWNSEND CORDED HORIZONTAL CERAMICS

The Rappahannock Incised (horizontal motif) ceramics have bands of lines incised parallel to the vessel lip with short, vertical lines sometimes incised from the lowest band. Townsend Corded Horizontal has horizontal cord impressed bands often surmounted by a surmounting oblique or vertical cord impressions. Sullivan Ware is a thin walled, lightly shell tempered ware with partially smoothed cord marking. Both incising and cord-wrapped stick decoration can be present, but only the cord marked variety was noted within the study area. The characteristic projectile point of this phase is the Madison point, a thin triangular point usually isoceles in shape. Chert is the most commonly used raw material within the study area with minor amounts of rhyollite, quartz and argillite being employed (see Figure 78). The presence of pure and mixed components showing Potomac Creek influences, such as Potomac Creek ceramics, a corded or plain ware with crushed quartz or sand temper; Mayoane Ware, tempered with fine sand giving a gritty texture; and Potomac projectile points, a very small equilaterally shaped triangular point, indicate the strong influence of this Western cultural manifestation in the study area.

The exact relationship between the Townsend Ware using groups and the Potomac Creek using groups has been discussed extensively in the literature (Clark 1977; Giffith 1977, 1980; Steponaitis 1977, 1980). Clark (1977:178-236) offers a model based on his work on the Western Shore which suggests that Rappahannock Incised (horizontal motif) was replaced by Townsend Corded Horizontal and Sullivan ceramics as a result of the acceptance of Potomac Creek decorative motifs by the peoples of the

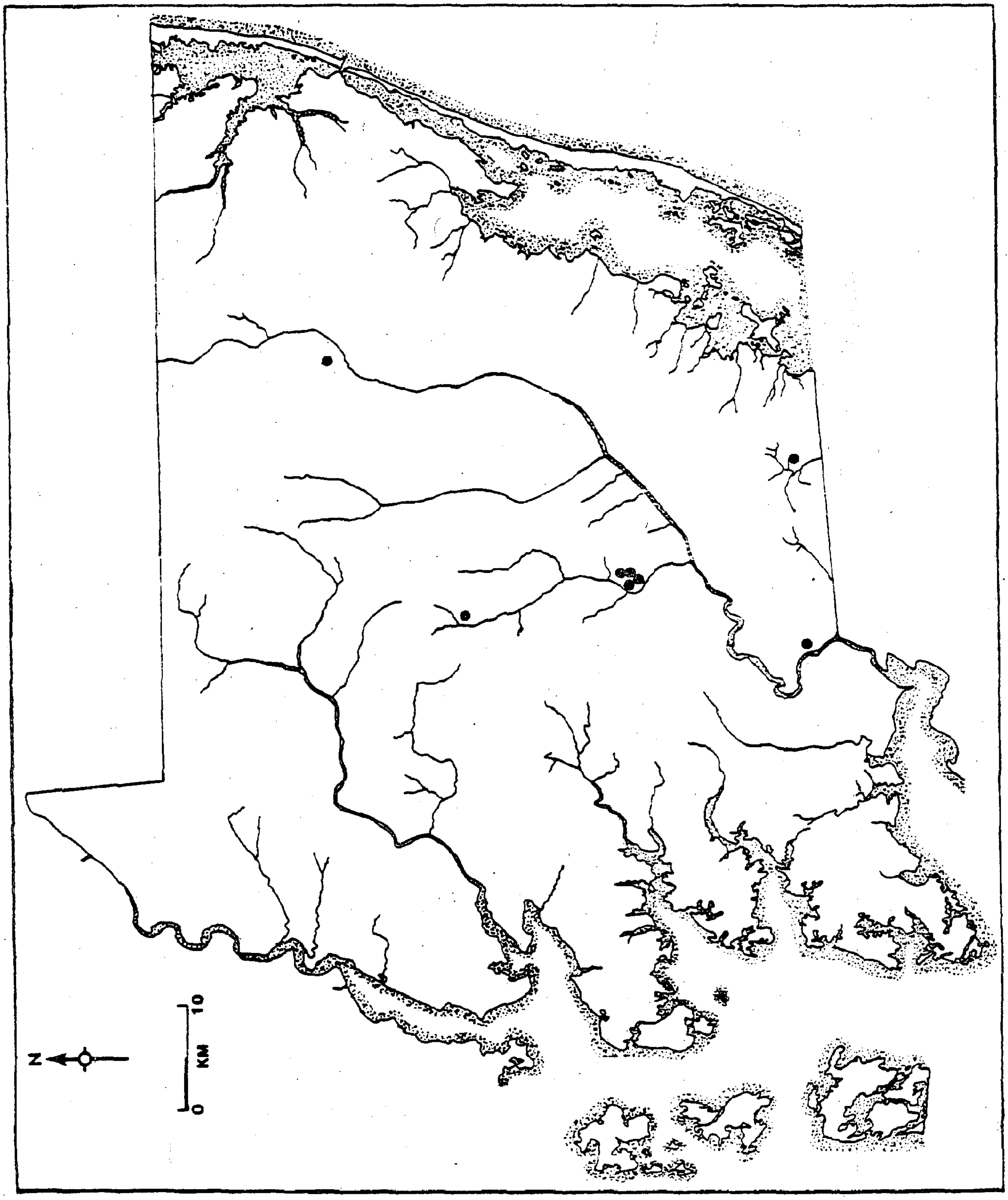


Figure 81 : DISTRIBUTION OF SULLIVAN WARE CERAMICS

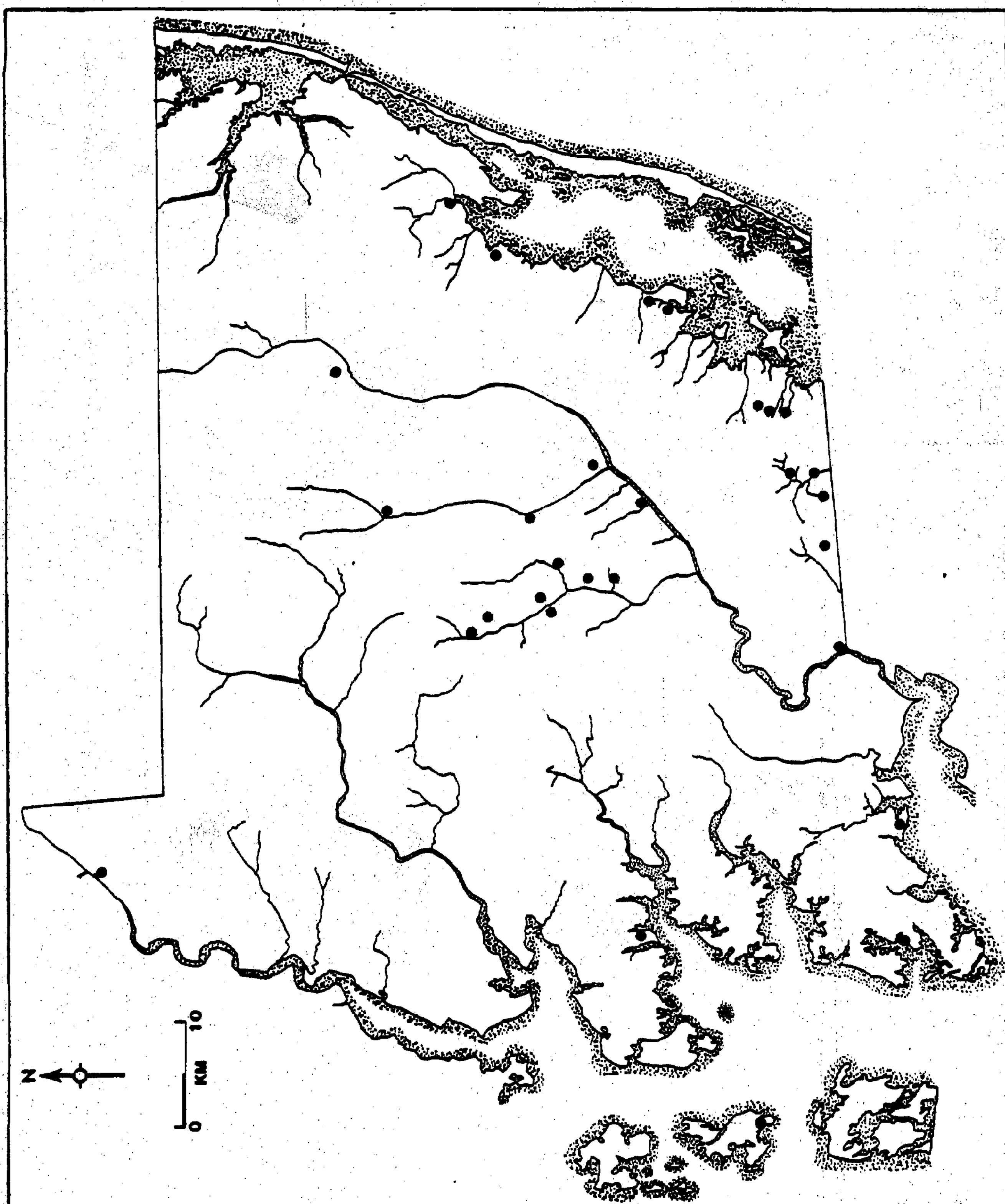


Figure 82 : LATE WOODLAND - SULLIVAN COVE PHASE

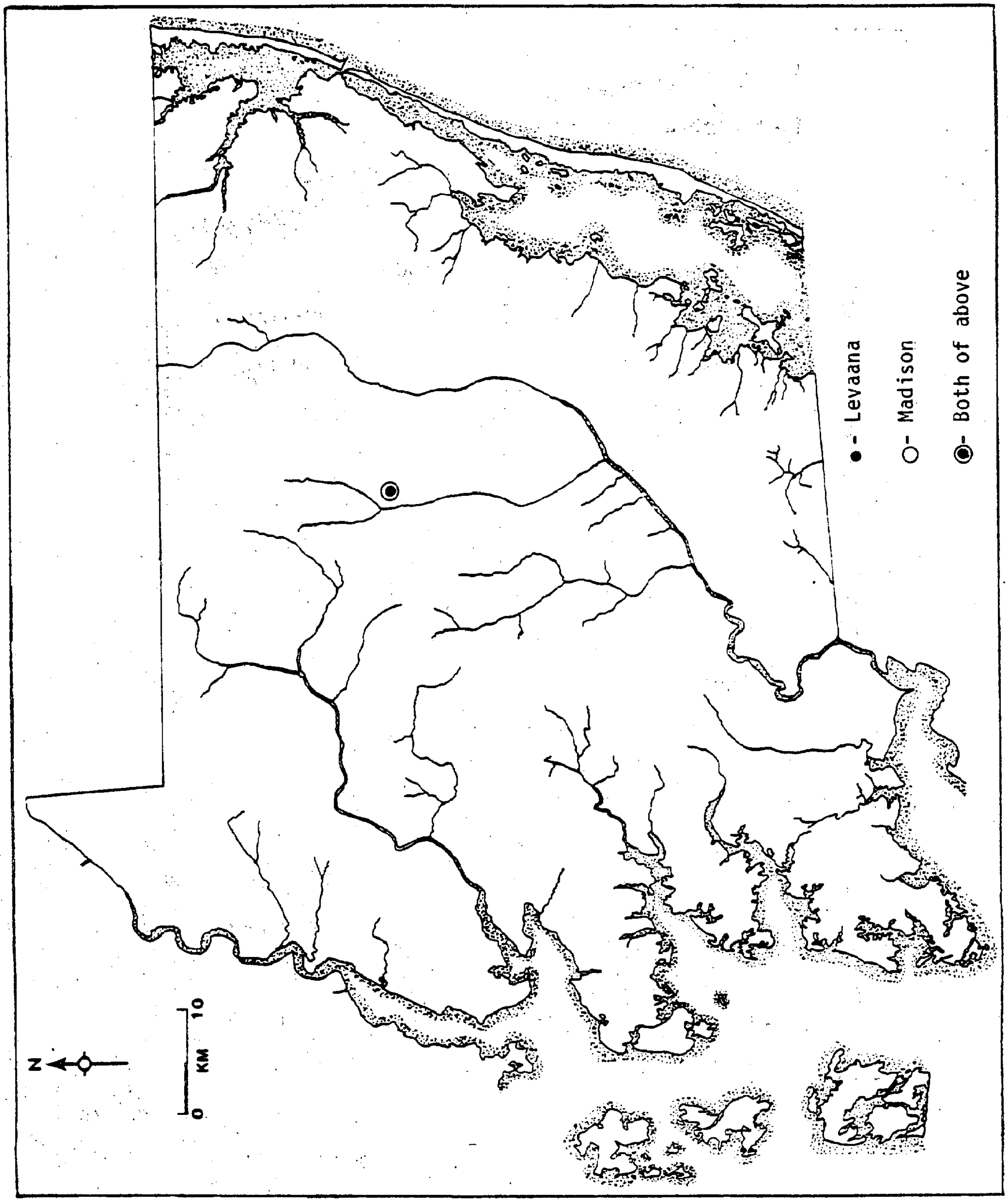


Figure 83 : PROJECTILE POINTS ASSOCIATED WITH TOWNSEND CORDED SERIES CERAMICS

Townsend ceramic tradition. The small sample size noted for Townsend Corded Horizontal wares (a type thought to represent the total acceptance of Potomac Creek motifs by Townsend tradition peoples) on the central and northern Western Shore by Clark (1977) is speculated to be the result of the displacement or assimilation of the Townsend population by the Potomac Creek group. Steponaitis (1980:108) offers the possibility that the low frequencies of Townsend Corded Horizontal and Sullivan wares may suggest that they are minority wares within the total ceramic assemblage of the Patuxent drainage. Within the study area on the Eastern Shore, a low frequency of Townsend Corded Horizontal and Sullivan Wares, associated with a high frequency of Rappahannock Incised (horizontal motif) wares is <u>not</u> noted as it is on the Western Shore. In fact, this relationship is reversed within collections examined from the study area. Here, there are very few sites with Rappahannock Incised (horizontal motif) ceramics present (see Figure 79), while many more sites show a presence of Townsend Corded Horizontal Ware (see Figure 80) and/or Sullivan Ware (see Figure 81). This data seems to agree with Clark's model suggesting a replacement of Rappahannock Incised (horizontal motif) ceramics by Townsend Corded Horizontal and Sullivan Wares as a result of increasing western influence by Potomac Creek using groups. High levels of Townsend Corded Horizontal ware, along with the probable continued high presence of Rappahannock Fabric Impressed ceramics, suggests a continued dominant presence of Townsend tradition peoples within the study area, but with clear Potomac Creek influences at work. A corresponding high level of sites with Potomac Creek tradition wares present, but in small absolute numbers, (see Figure 84) may show that Griffith's (1980)

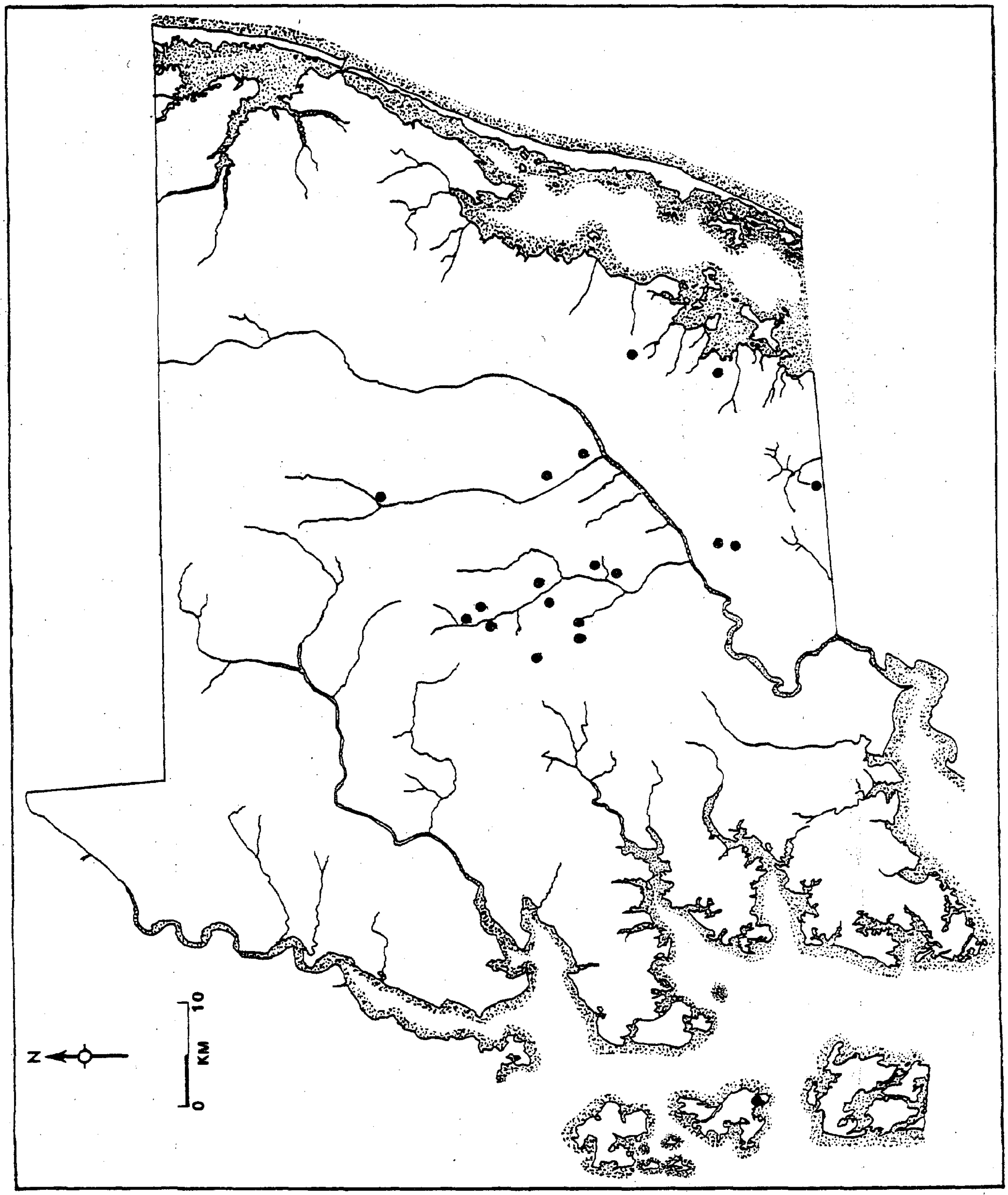


Figure 84 : LATE WOODLAND - POTOMAC CREEK

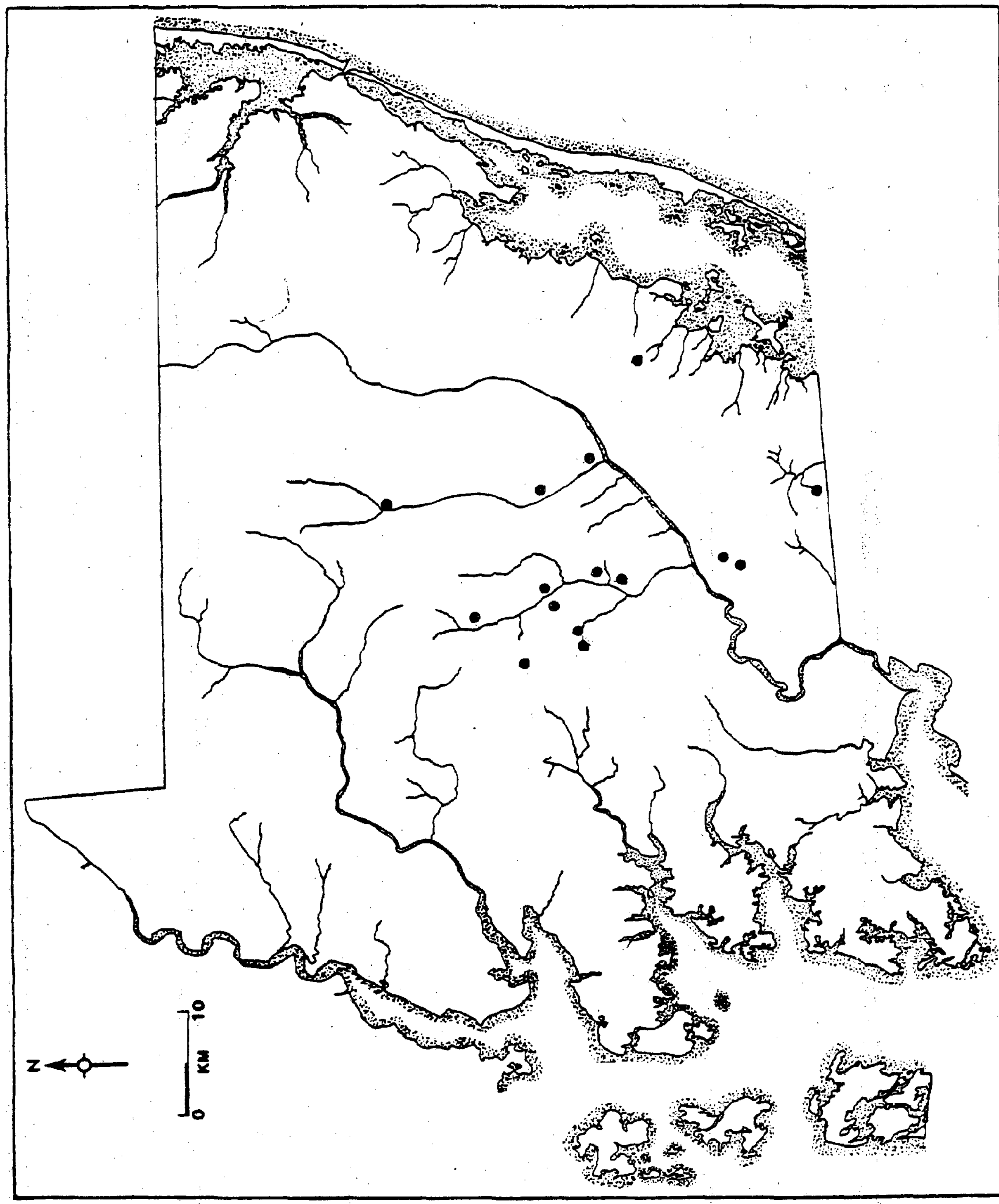


Figure 85 : DISTRIBUTION OF POTOMAC CREEK CERAMICS

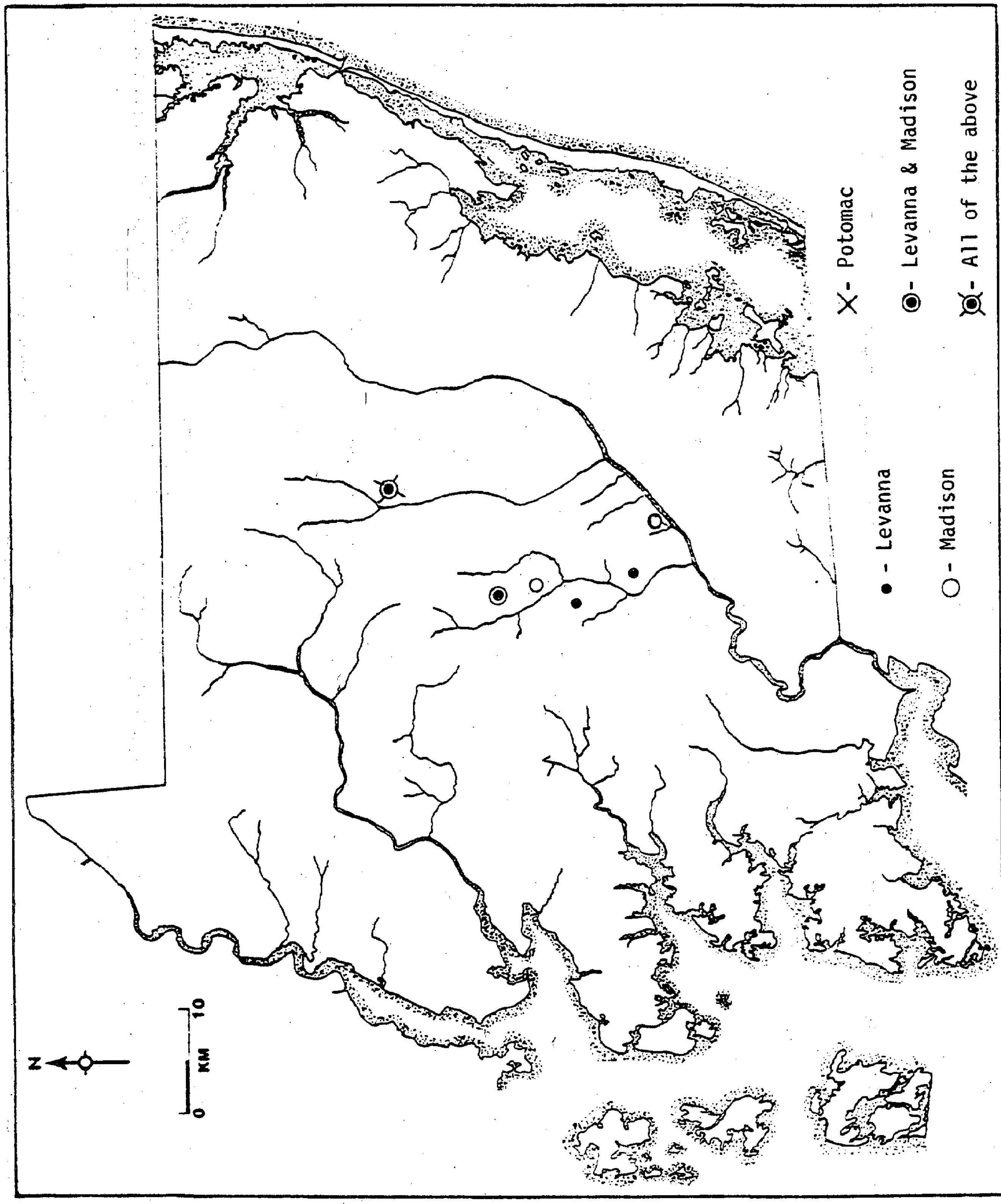


Figure 86 : PROJECTILE POINTS ASSOCIATED WITH POTOMAC CREEK CERAMICS

suggestion of transient use of areas of the Eastern Shore and trade between groups of the two traditions was indeed occurring within the study area. Trade between groups is the most likely explanation as Potomac Creek tradition wares occur at many of the same sites as do the Townsend tradition wares. Cultural influences seem to be a major factor in this instance.

A subsistence strategy based upon the heavy utilization of cultigens and supplemented by the seasonal exploitation of the diverse environmental zones of the study area was probably practiced at this time. An increase in the number of sites from the last phase suggests a population increase, probably due to increased productivity due to agriculture. The descriptions by John Smith of the Indian groups he saw during his voyage up the Chesapeake Bay in 1608 (Arbor 1910) are probably very close to the type of subsistence strategy practiced during the Sullivan Cove phase. These descriptions portray a heavy dependence on agriculture supplemented by seasonally available resources. Without further data on site size and use, this subsistence-settlement pattern model must remain speculative. It is possible that agriculture played a minor role in the subsistence of peoples on the lower Eastern Shore.

POST-CONTACT PERIOD

The Post-Contact Period, here defined as post A.D. 1600, was a time of very rapid and far-reaching changes among the native groups of Maryland's lower Eastern Shore. The effects of European contact must

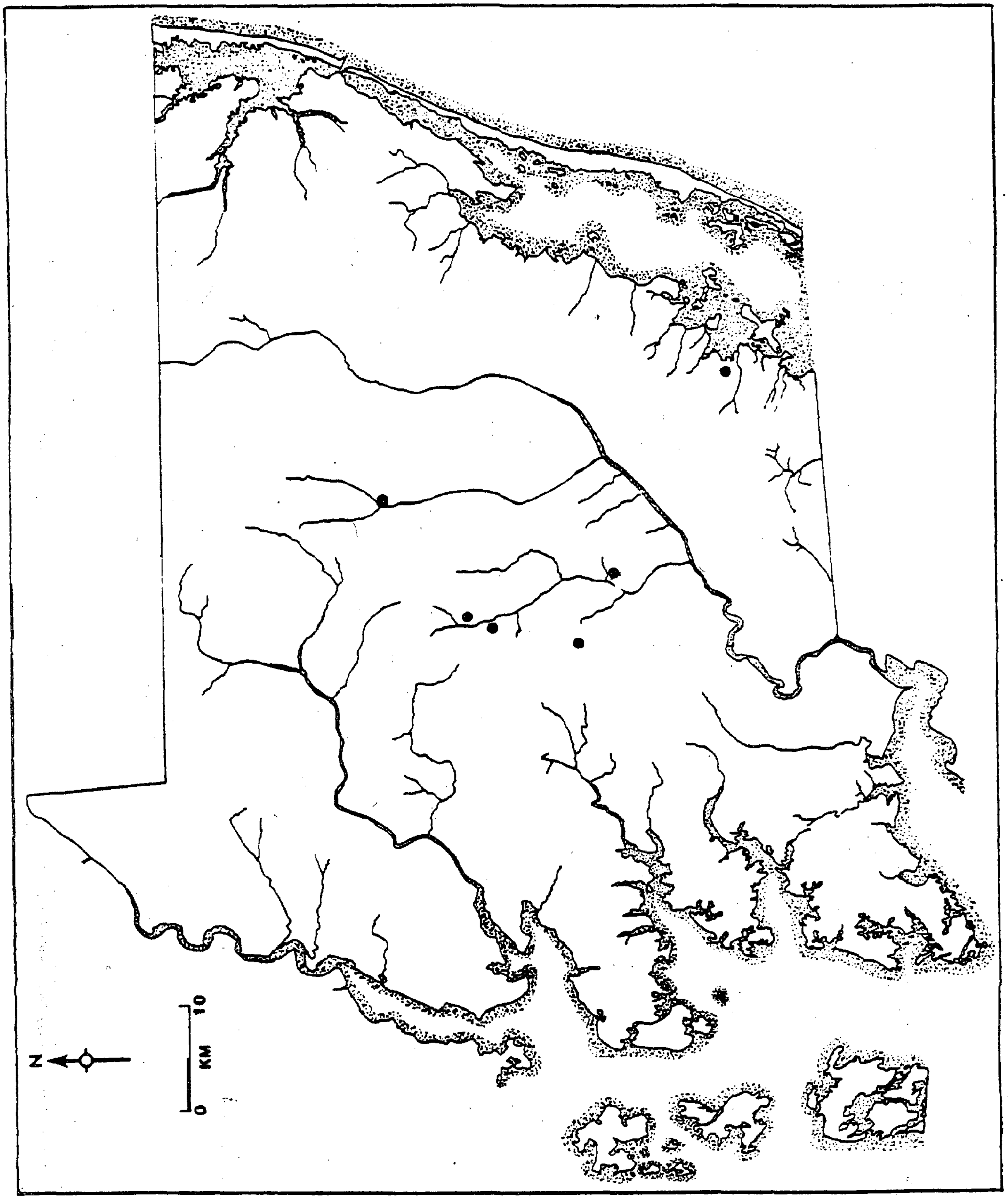


Figure 87 : DISTRIBUTION OF MAYOANE
WARE CERAMICS

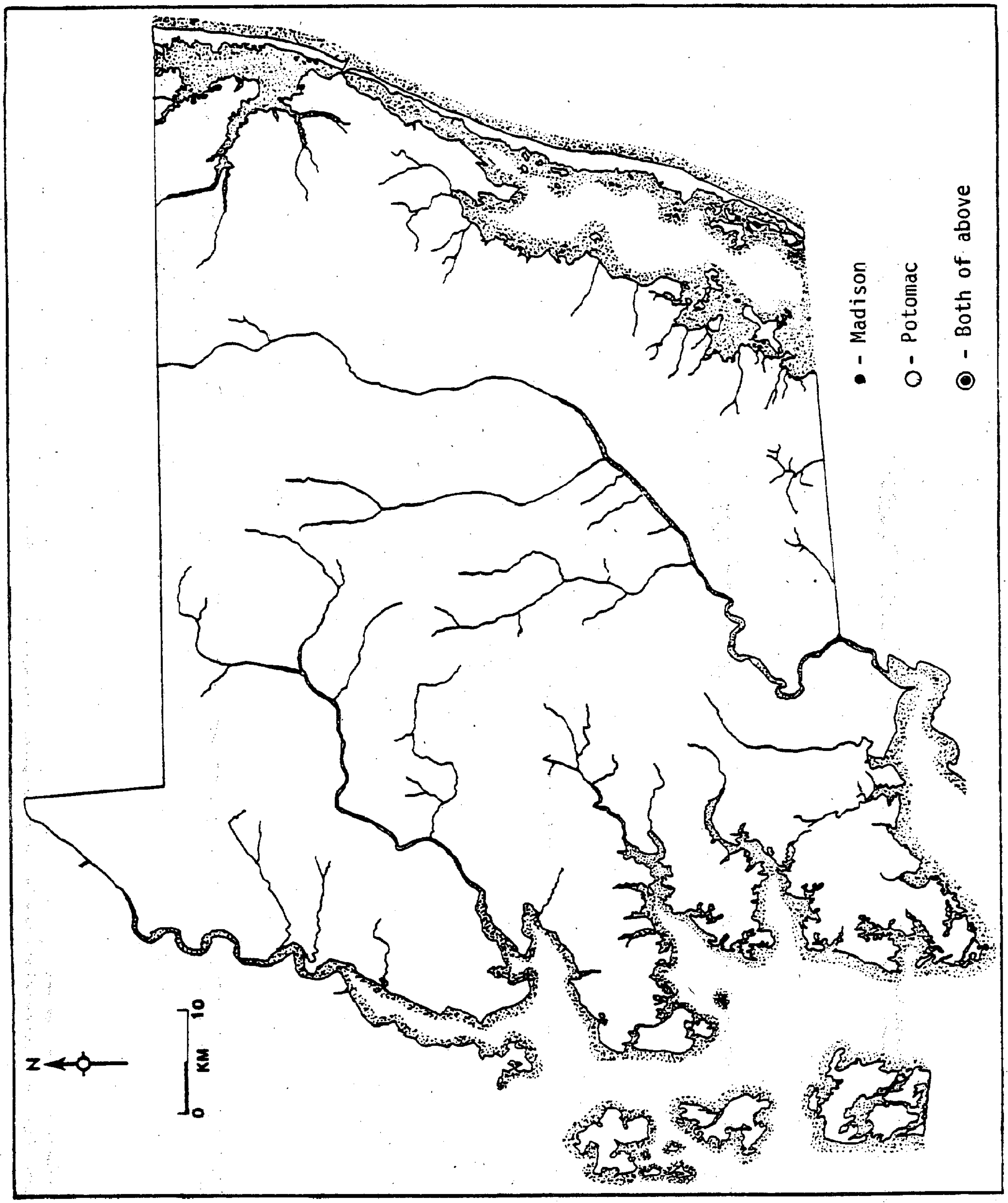


Figure 88 : PROJECTILE POINTS ASSOCIATED WITH MAYOANE CERAMICS

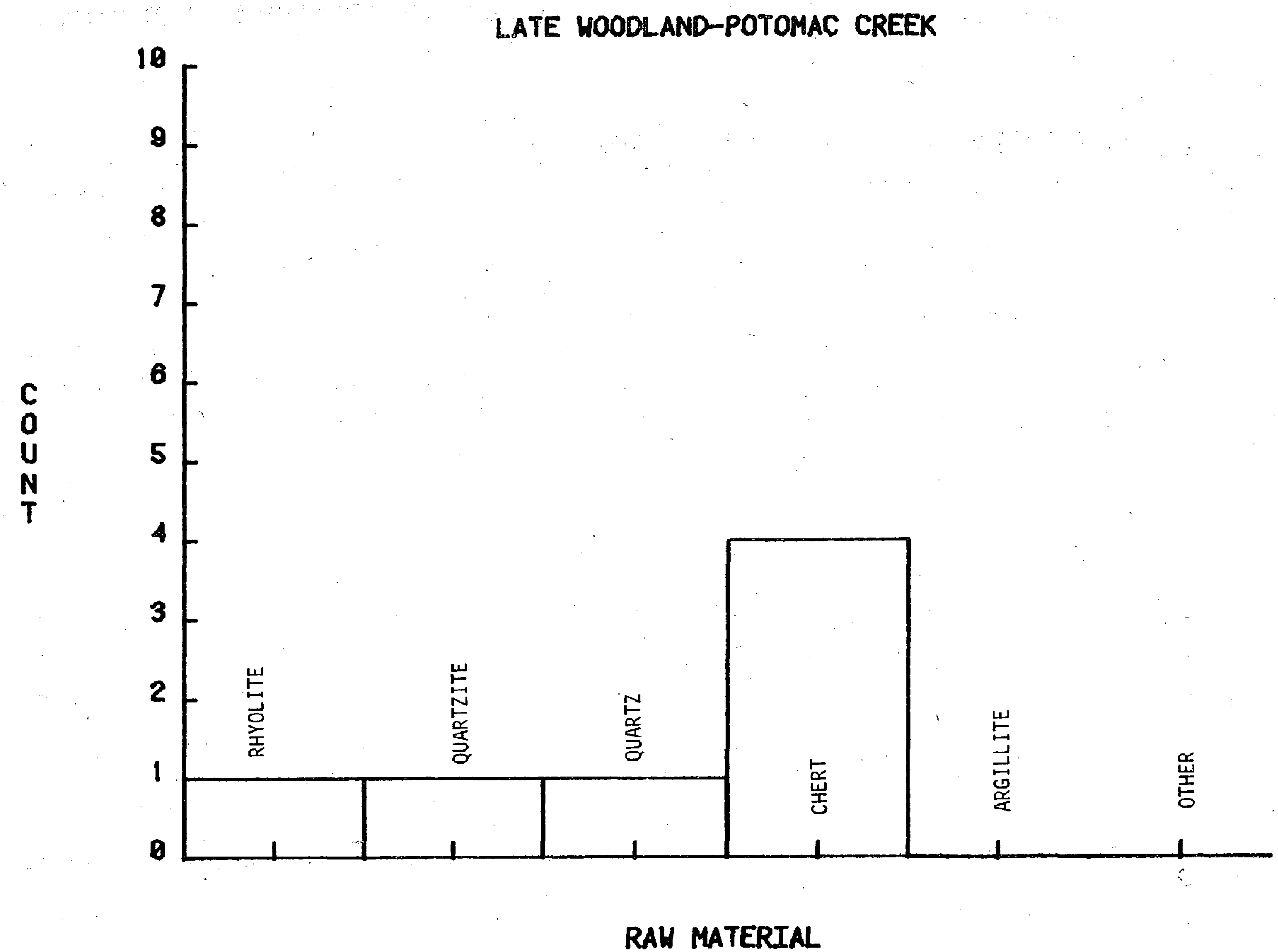

LATE WOODLAND-POTOMAC CREEK
COUNT
10
9
8
7
6
5
4
3
2
1
0
RHYOLITE
QUARTZITE
QUARTZ
CHERT
ARGILLITE
OTHER
RAW MATERIAL

FIGURE 89

have made themselves felt among the native peoples of the Eastern Shore long before intensive settlement began around 1650. Disease probably preceeded European settlement, acting to reduce populations and perhaps upset the social structures. The native groups of the study area, the Nanticokes and associated groups, were said to live in groups of "two or three little houses, in each a fire" by John Smith in 1608 (Arbor 1910). This probably agrees with the archaeological evidence noted in this study which suggests numerous small farming and fishing sites from which seasonal forays for resources would be made. These sites would be characterized by an archaeological assemblage very similar to the preceeding Sullivan Cove Phase with Townsend Corded Series ceramics and triangular projectile points being present. A lack of fortified villages noted by Smith indicates that the peoples of the area were not engaged in extensive hostilities at the time of contact, as was likely the case on the Western Shore, but some preliminary evidence from aerial surveys of the area may indicate the presence of circular palisaded villages in the northern part of the study area.

Further discussion of the post-Contact Period will follow in a report by Dr. T.E. Davidson in the spring of 1981.

CHAPTER VIII: CRITICAL AREAS

The archaeological record of any region is present in many forms. The traditional focus of most archaeological work has been the "site." Problems arise, however, because the site only represents one aspect of any region's archaeological record. This regional record has been defined by Dunnel and Dancey (n.d.:9 in Sciffer et al. 1978:2) "as a more or less continuous distribution of artifacts over the land surface with highly variable density characteristics." Using this definition, a site would be viewed as a high density area, while other areas of a region would be classified as either moderate or low density or, at the bottom of this ranking, the single artifact find. Recent work has demonstrated that such isolated artifacts and low density scatters can tell us much about a region's prehistory (Thomas 1975; Rodgers 1974). As a result of this, any management plan or research design should take the entire range of artifact density areas into consideration when looking at a region's archaeological record. Since real world constraints of funding do arise, we must at some stage select smaller sampling universes for study from the entire regional archaeological landscape which will ideally include a sample of a full range of artifact density areas, representing all time periods which occur within the region. This difficult task can only occur after some knowledge has been gained of the regional archaeological record through preliminary studies such as this one. Once certain characteristics of these artifact density areas have been identified (such as their environmental locations) then numerous techniques can be brought to bear, for example aerial photographic survey, Landsat coverage and high altitude U-2 coverage, that will aid in the identification of areas where archaeological remains have a high probability of occurring. Such areas, which will here be labeled critical areas, can then be identified for management and research purposes. These critical areas will represent places where either a high density of sites from many time periods are known to exist, or places where remote sensing techniques and other research tools have identified a high probability of archaeological value, or places where both techniques have indicated that these are areas important to the prehistory and history of the region. Critical areas so identified which are also experiencing high stress due to land development should be seen as of particular importance due to the high probability of their destruction.

This chapter will attempt to use the data gathered during the preparation of this report to identify some critical areas within the lower Eastern Shore of Maryland. Additionally, some preliminary results of a test program using the remote sensing techniques of low and high level aerial photographic reconnaissance and Landsat orbiting satellite multispectral scanner images to identify critical areas will be presented (see Appendix II).

A brief discussion of critical areas follows.

PARSONSBURG SAND FORMATIONS

The central Delmarva Peninsula is in many areas covered by a suficial blanket of sand known as the Parsonsburg Sand formation (Denny et al. 1979). The Parsonsburg sand is found in two topographic situations: in parabolic dunes on the east side of rivers such as the Nanticoke, Wicomico and Pocomoke; and in large areas of the central uplands where it blankets the land surface. In the upland areas, the surface of the sand is found either heaped into dunes or ridges separated by poorly drained depressions, or as level to gently rolling formations. It is the dune or ridge formations which are of interest here as high numbers of prehistoric archeological sites were found to occur on them. Radiocarbon dates from these formations place their age at between 30,000 to 13,000 B.P. (ibid), meaning they were formed during the middle to late Wisconsin period. The Parsonsburg Sands consist of the Lakeland and Evesboro Series of soils as identified by the U.S.D.A. Soil Conservation Service (Hall 1970, 1973; Mathews and Hall 1966). The Lakeland and Evesboro Series soils are described as excessively drained sandy soils formed in marine or old alluvial sediments made up of medium and coarse sand. Scrub hardwoods, predominantly oak, are the native tree cover with shortleaf pine and Virginia pine present on the sand ridges and some loblolly pines present on the nearly level areas. Understory shrubs are generally lacking (ibid). The soils are described as easy to work and as being workable within a wide range of moisture content. They are among the first soils to warm in the spring and are subject to wind blowing (ibid).

The theory of Parsonsburg Sand formation advanced by Denny, Owens, Sirkin and Rubin (1979) provides some possible clues as to its desirability to the prehistoric populations of the study area. Denny et al. postulate, based upon numerous sections and cores, that most of the sand ridges formed by being blown across a pond or a swamp.

They state:

> We picture the central Delmarva upland during Parsonsburg time as a pine-birch barrens where isolated sand dunes were separated by small ponds or bogs. The present landscape on the Parsonsburg Sand consists of low sandy ridges separated by broad poorly drained swales and perhaps resembles the landscape as it was during Parsonsburg time...Ponds were present between sand hills because evapotranspiration was low as a result of cool temperatures and sparse vegetation. Dunes advanced into ponds, where the sand was redistributed by circulating currents in the water.

This picture of dune or ridge formation associated originally with swampy areas is very interesting for its subsistence implications. The end dates for this formational process could conceivably overlap with the earliest human occupation of the area and even to the present day many of these ridges are associated with inter-ridge swamps or poorly drained areas. See the geologic maps for Wicomico and Worcester counties (Owens and Denny 1978, 1979) and the U.S.D.A. Soil Survey books (Hall 1970, 1973; Mathews and Hall 1966) for exact locations of sand ridges. Such swamp or poortly drained areas provide excellent sources of food (see Chapter V) and seem to have been highly attractive to man during all prehistoric periods (see Distribution Maps in Chapter VII). Presumably the associated sand ridges provided dry encampment bases near high biomass resource areas. During later phases of the Woodland period it is conceivable that these soils, being among the "first to warm in the spring" (ibid), may have been good areas for the early planting of certain crops and in all time periods they would have provided about the first ecological area where spring plant growth would have begun. However, it must be noted that overall the sand ridges are poor areas for plant growth (Hall 1970) and it is probable that their main attraction was in providing high and dry encampment areas. A reasonably sized catchment area around most of these sand ridges where sites are known, say the normally quoted 5 to 10 kilometer circular catchment area quoted by Hodder and Orton (1976), would include numerous micro-environmental zones that would produce a wide variety of food resources.

Preliminary figures by Davidson (personal communication) show that known archaeological sites within the study area have an approximately fifty times greater chance of occurring on Parsonsburg Sand ridges than on any other soil formation in the one county which he drew his figures from (Worcester County). This amazingly high probability cannot be ignored in future when both management and research plans are being constructed.

An area of particular interest for both planning and research purposes which is associated with Parsonsburg Sand formations occurs in south-central Worcester County along the east bank of Dividing Creek. This area lies in a great sweeping bend of the creek and contains numerous sand ridges in association with swamp areas bordering the creek and areas to the east and west of moderate to well drained heavier soils which would have supported extensive forest growth. Virtually every sand ridge at this location has extensive artifact scatters present on them. These artifacts date to all periods of prehistoric time from Paleoindian to Late Woodland. The high artifact recovery in this area is probably at least partially due to its proximity to numerous collectors homes, but a similar high rate of artifact occurrence on sand ridges distant from the normal collector areas argues that more is at work here than collector bias. To test this theory, an environmentally similar area far from any known collectors was selected for a test using Landsat satellite data. The results are presented in Appendix II.

Thus, it would appear that virtually any area where ridge formations of the Parsonsburg Sand exist have a very high probability of site occurrence. For management purposes any such formation should be considered a critical area which requires archaeological investigation before development takes place. It is hoped that upcoming work with Landsat and aerial photography will go further towards identifying specific recognizable attributes of sites located on these sand ridges, with the result that any such threatened area can be quickly and inexpensively checked for site occurrence using this remote sensing data.

ATLANTIC COASTAL AREA

As mentioned earlier in this report, the Atlantic coastal drainage area is undergoing very heavy land development pressures, especially around Ocean City. In addition to these man-made pressures, nature is also impinging upon this area through the processes of sea level rise and its associated shoreline transgression and erosion (see Chapter VI). This erosion and inundation has caused quite dramatic changes, even in the last 130 years. The rate at which the processes have occurred can be judged by the changes in shorelines and off-shore islands seen in Figures 90, 91 and 92. These figures are reproduced from a Maryland Department of Natural Resources study of shoreline erosion rates since 1850 (1975) and clearly demonstrate the changes which have occurred since then in many areas of the Atlantic coastal zone. With such rapid development and erosion taking place, it is to be expected that any archaeological resources present in these areas are severely threatened. Much of the mainland coastal zone is made up of a geologic formation known as the Sinepuxent Formation (Owens and Denny 1978). This formation is described as "having a soil profile similar to that on the Parsonsburg Sand" (ibid). Sites which are known in this area almost invariably occur on the Sinepuxent Formation and it can be expected that many of the same processes which affected prehistoric populations on the Parsonsburg formations were also at work here. The back bay areas behind Assateague Island possess high levels of shellfish and waterfowl resources. Undoubtedly these were exploited by prehistoric populations and the presence of numerous sites in the area attest to this.

For the purposes of this study, it should be noted that certain problems were encountered in assessing the archaeological resources of this area. Particularly in those areas around Ocean City, there was a problem with locating local collectors. Such collectors undoubtedly exist, but the peculiarities of this area as a resort community during

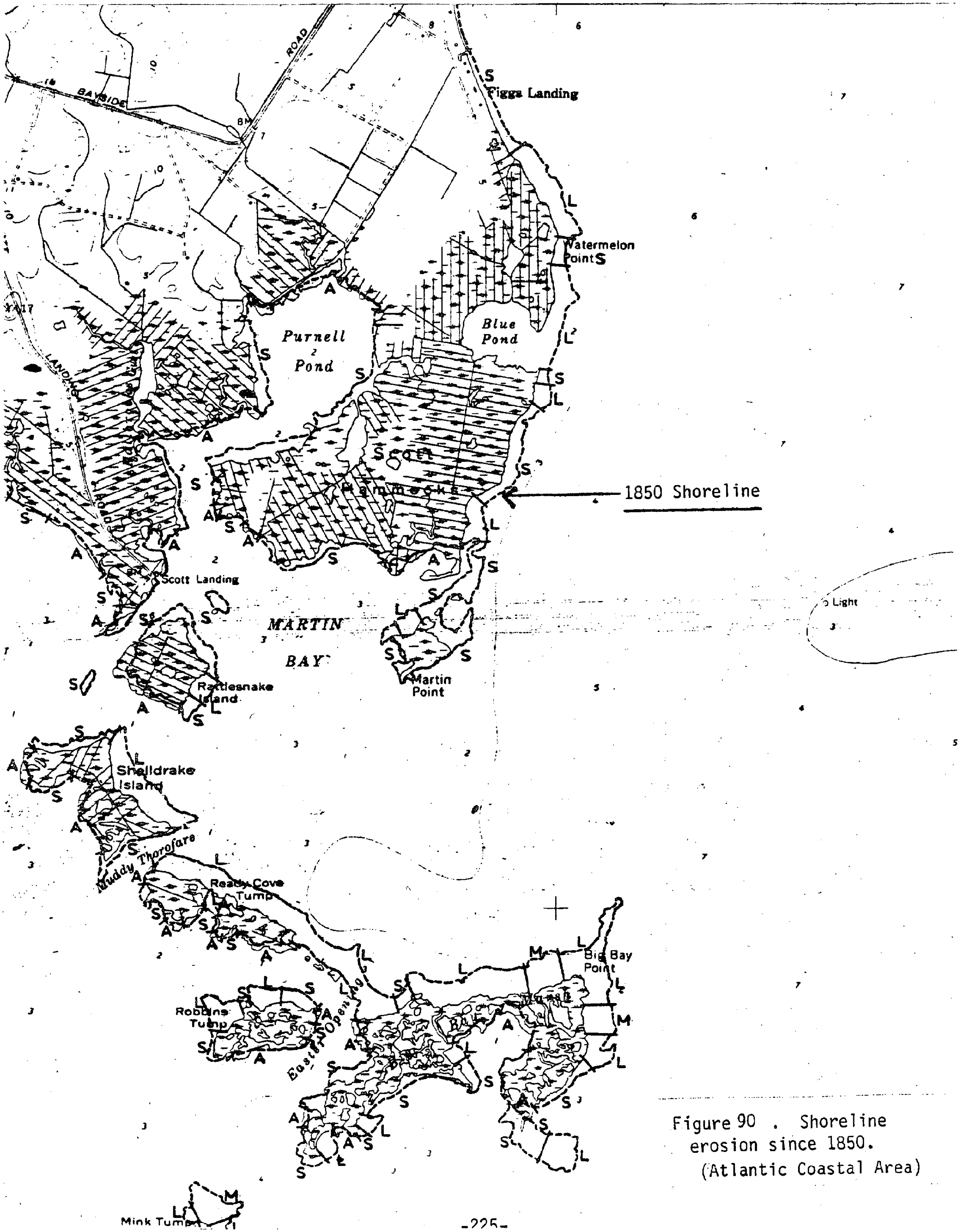


Figure 90 . Shoreline erosion since 1850. (Atlantic Coastal Area)

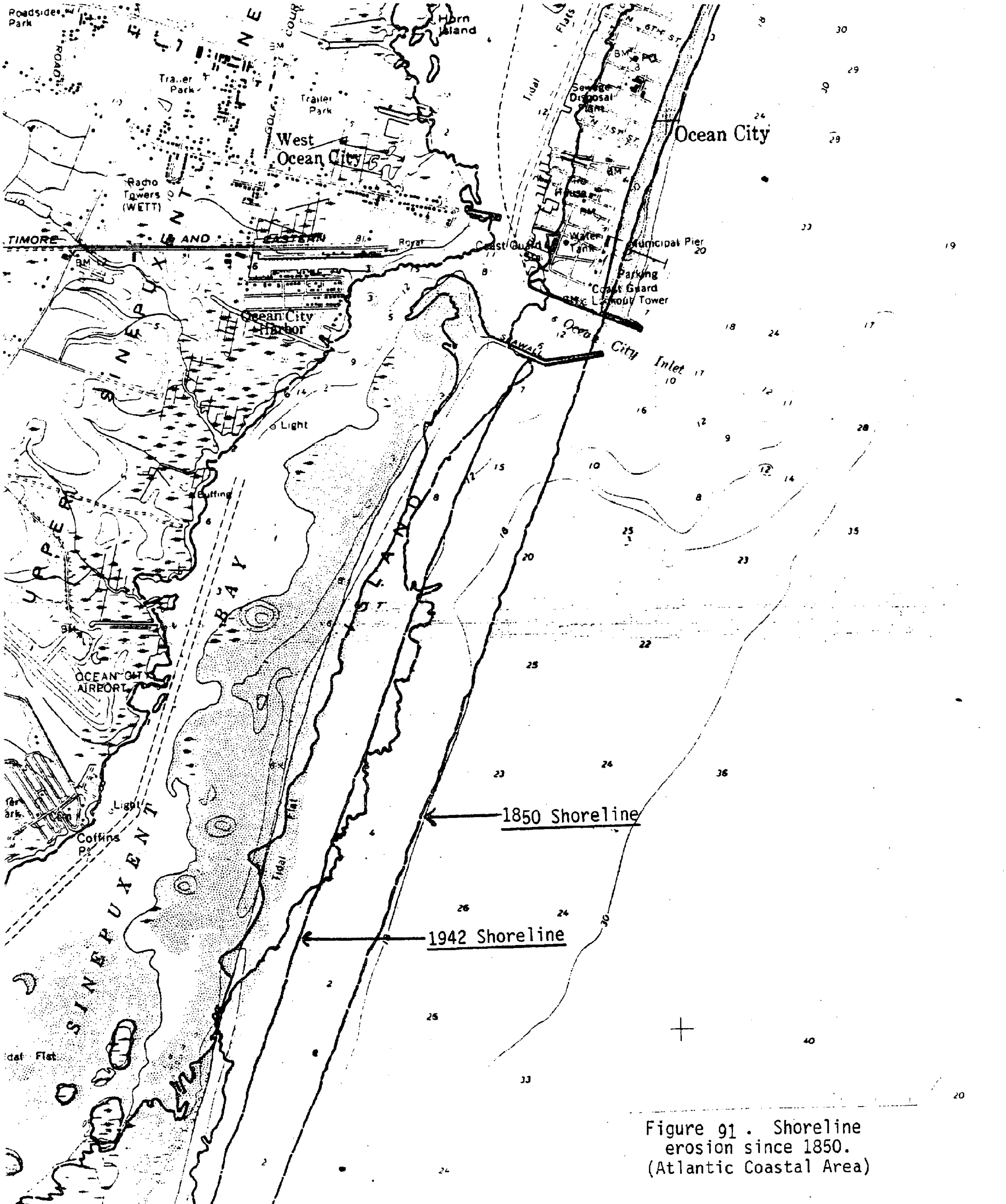


Figure 91 . Shoreline erosion since 1850. (Atlantic Coastal Area)

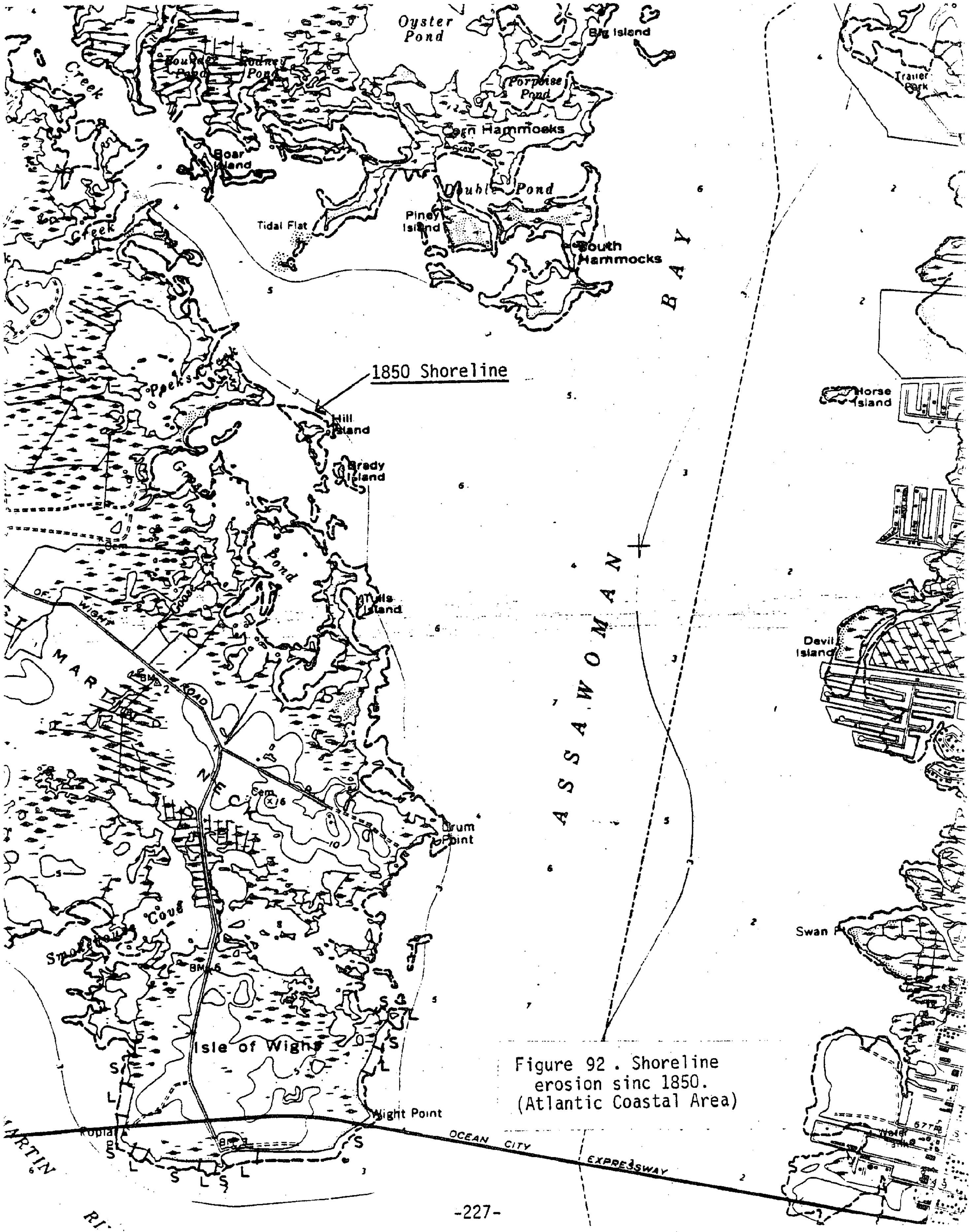


Figure 92 . Shoreline erosion sinc 1850. (Atlantic Coastal Area)

the summer months tends to make it very difficult to contact the native residents. Many residents leave the area during the summer and early fall in order to rent their properties to tourists. Other property owners do not live in the area at all but are absentee landlords. This restricts access to possible sites and often has resulted in collections being removed or destroyed. It is probable that more collectors could be located during the winter months when many more residents would be present. This should be attempted in the future as the unique stresses upon this area make the gaining of a more thorough knowledge of the known prehistoric resources imperative. All evidence points to the mainland shore areas and the back bay islands as being very productive of prehistoric archaeological sites and at present the shore and island areas should be considered as critical areas. Some form of intensive survey is highly recommended for this area as the peculiarities of its current status makes any other form of assessment very difficult.

"MOUND" AREAS

Two large earthen formations, very similar in size and shape to known man-made earthworks or "mounds," are known to exist within the study area. No such constructions have ever been positively identified on the Delmarva Peninsula although numerous references have been made to the out-of-character appearance of at least one of these formations by professional archaeologists (Daniel Griffith- pers. comm.). Neither of the two formations, known locally as the Parsonsburg Mound and the Pusey Mound, have been systematically examined although brief examinations of both have shown the presence of artifacts and local informants speak of artifacts being collected from the two formations for many years. The author noted a particularly high artifact density on the Pusey Mound (18WO21) which is not as widely known as the Parsonsburg Mound. This lack of notoriety may account for the higher artifact density due to less surface collecting having occurred over the years.

The normal topography of the study area is generally very level, with only the Parsonsburg Sand ridge formations providing some relief. These ridges are usually U-shaped as a result of formation by blowing winds. Neither the Parsonsburg or Pusey mound has such a shape, one being oblong and the other very precisely circular. The height of both these formations is also much greater than expected in this area.

All of the above factors combine to suggest the high probability of these formations not being the result of natural geologic processes. While such a possibility cannot be ruled out, it is suggested that both of these formations be considered critical areas in need of further archeological and geological study.

UPPER TANGIER SOUND AREA

The upper Tangier Sound area north of the Big Annemessex River to the Northwest bank of the Nanticoke River and including the Bay islands of Bloodsworth, South Marsh and Smith, represents an area which has undergone extensive physiographic alteration since the last Ice Age. The current physiography and geography of the area is the result of sea level rise over the last 13,000 years. The area is divided by numerous drainage systems which all empty into Tangier Sound. In earlier periods (prior to 3000 B.P.) these drainage systems all converged to empty into the ancestral Susquehanna River or forming Chesapeake Bay (see Chapter VI for further discussion). This geographic layout, where numerous drainage systems converge into a relatively small area, has presumably always presented an area of extreme environmental diversity to human groups inhabiting this part of the Eastern Shore. Multiple micro-environmental zones within a relatively small area provided a wide range of food and non-food resource availability with the result that human groups were attracted here during all prehistoric time periods. The area seemed especially attractive to the early Paleoindian and Archaic Period peoples. As the Paleoindian and Early Archaic Periods are poorly understood on the Eastern Shore, this area should be viewed as being particularly important for the study of these earliest inhabitants. Later period shell middens are abundant showing the areas continued importance in later prehistoric times. Shoreline and island inundation due to sea level rise has obscured much of the earliest remains, but the higher stands of land still show extensive traces of human habitation during all time periods and should be investigated before any alterations occur.

CHAPTER IX: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The goals of the research presented in this report are:

1. To construct a preliminary chronological sequence for the study area.
2. To develop a model of environmental change through time applicable to the diverse environments found on the lower Eastern Shore.
3. To combine the data gathered on artifact inventories, site locations, and environmental diversity and change in order to suggest possible adaptational shifts during the different phases.
4. To define selected critical areas of high archaeological research value.

Information from all areas of the Middle Atlantic region was used as a baseline from which models were generated and to which data was compared. Similarities and differences between the study area and surrounding regions were noted.

As has been briefly discussed earlier, both the data and the methodology used in this research have certain limitations which should be outlined. First, the chronological sequence defined in this report is based upon the concept of "phase." Willey and Phillips (1958:22) define the phase as "an archaeological unit, possessing traits sufficiently characteristic to distinguish it from all other units similarly conceived."

The traditional way of meeting this definition was to develop a list of traits for each phase and then apply this to the archaeological materials being examined. The problem with such trait lists is that they do not aid in understanding the underlying cultural behavior which produced the archaeological record. Binford (1965:205) states that a cultural system has many variables in operation and "its operation is to be understood in terms of many causally relevant variables which may function independently or in varying combinations." Thus, it seems that two problems are present when trying to define phases. First, we must define culture in such a way that we will be dealing with specific examples of multivariant systems (i.e. cultures) when we speak of phases and; second, it is necessary to accurately identify examples of these specific cultural systems in the archaeological record, which we see revealed by way of the artifacts we examine. In effect, the solution to the second of these two problems provides us with a typology of artifacts which allows the separation of the archaeological record into segments based on morphological, technological and functional changes in artifacts, while answering the first problem demands that we take these separate segments defined by our typology and view them in a systemic sense as prehistoric cultures which functioned as complete systems with economic, social, material and environmental factors at work within them. Clearly, given the nature of the data used in this study, this report has taken preliminary steps in creating a usable typology of artifacts which provides the temporal segments necessary for a chronological sequence, but it has been impossible to make more than very basic statements regarding the total cultural systems which are responsible for and reflected by these artifacts.

Practical problems with the data itself involved such things as: a lack of artifact samples from many areas due to such factors as difficult access for collectors or even a lack of collectors in many areas; collector bias in the differential selection of certain artifact classes such as projectile points over less collected classes like ceramics or flakes and broken tools; and a lack of information on site sizes and artifact densities which would have allowed more meaningful comparisons to have been drawn between sites of the same phase.

The solution to the above problems lies in the application of a well designed systematic sampling strategy, with selected excavation, in order to aid in defining subsistence patterns and chronology. A sampling procedure, employing both probabilistic and non-probabilistic techniques, should be devised. The large size of the study area, coupled with a lack of funds, demands that a sample survey area be selected based upon the data collected in this study regarding the relationship between environmental variables and the occurrence of site and artifact types (see Critical Areas - Chapter VIII). The majority of sampling would be accomplished by pedestrian surface reconnaissance with the aim of totally surface collecting selected areas. This would provide a better understanding of total artifact inventories and intra-site structure, which in turn would allow much more meaningful comparisons to be made between sites and provide a fuller understanding of total cultural systems.

The knowledge of prehistoric subsistence and settlement patterns which such a study would provide would be of particularly great value to cultural resource managers. They would then be able to specify, with a high degree of certainty, areas which were likely to contain or not contain archaeological sites. Critical areas could then be identified and appropriate planning measures taken.

Based upon the data gained researching this study, it is recommended that the previously discussed systematic sampling strategy be applied to the areas of the Pocomoke River drainage system. The reasons for selecting this area are:

1. The Pocomoke drainage provides a natural north-south transect of the lower Eastern Shore of Maryland. Such a transect is ideal as the environmental and physiographic features of the Delmarva Peninsula vary according to their north-south position. The drainage includes areas representative of the many environmental zones of the lower Eastern Shore; from the Chesapeake Bay area, through cypress swamp areas, to the better drained upland regions. Almost all areas related to prehistoric subsistence strategies would be represented.
2. A very high density of archaeological sites have been demonstrated by this study to occur within the Pocomoke drainage area. These sites show continuous habitation for at least the last 10,000 years, thus all time periods should be represented within the drainage.

3. Large areas of the Pocomoke drainage are owned by the state in the Pocomoke State Forest. This will aid in carrying out a sampling program without undue delay and complications in securing private landowners' permission for survey.
4. The Pocomoke River was one of the earliest areas to be settled by European colonists. This means that the area also has very high potential for understanding historic European settlement of the Eastern Shore of Maryland. Areas such as Snow Hill were settled by the late seventeenth century and represent very important centers of Euro-American society from that day until the present. A high probability of contact period sites in such areas offers significant opportunity for the study of this period.
5. Numerous secondary stream juncture areas occur along the Pocomoke and its tributaries. These junctures seem to have been especially attractive to prehistoric populations, making them important features for future study and management decisions.

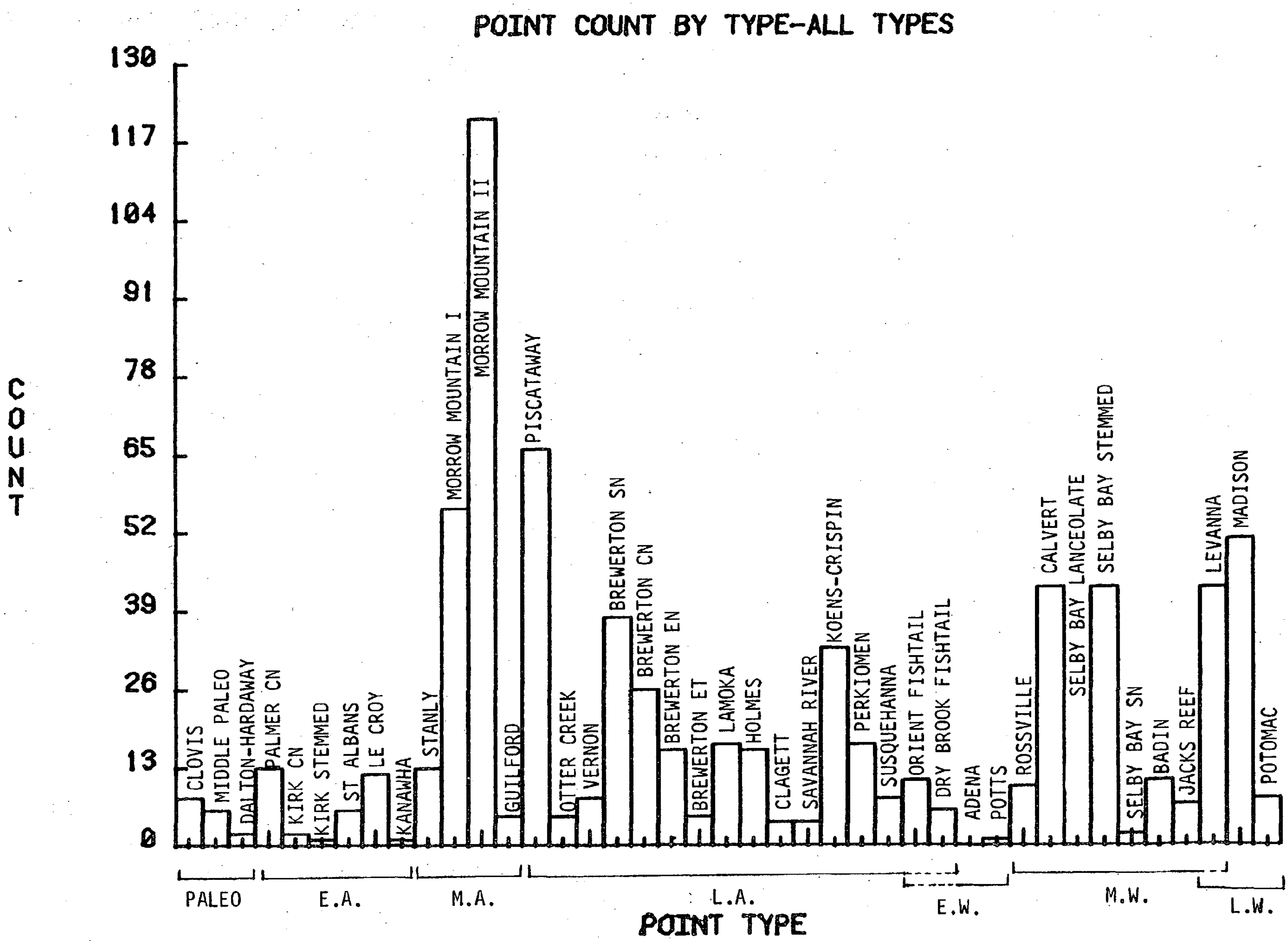
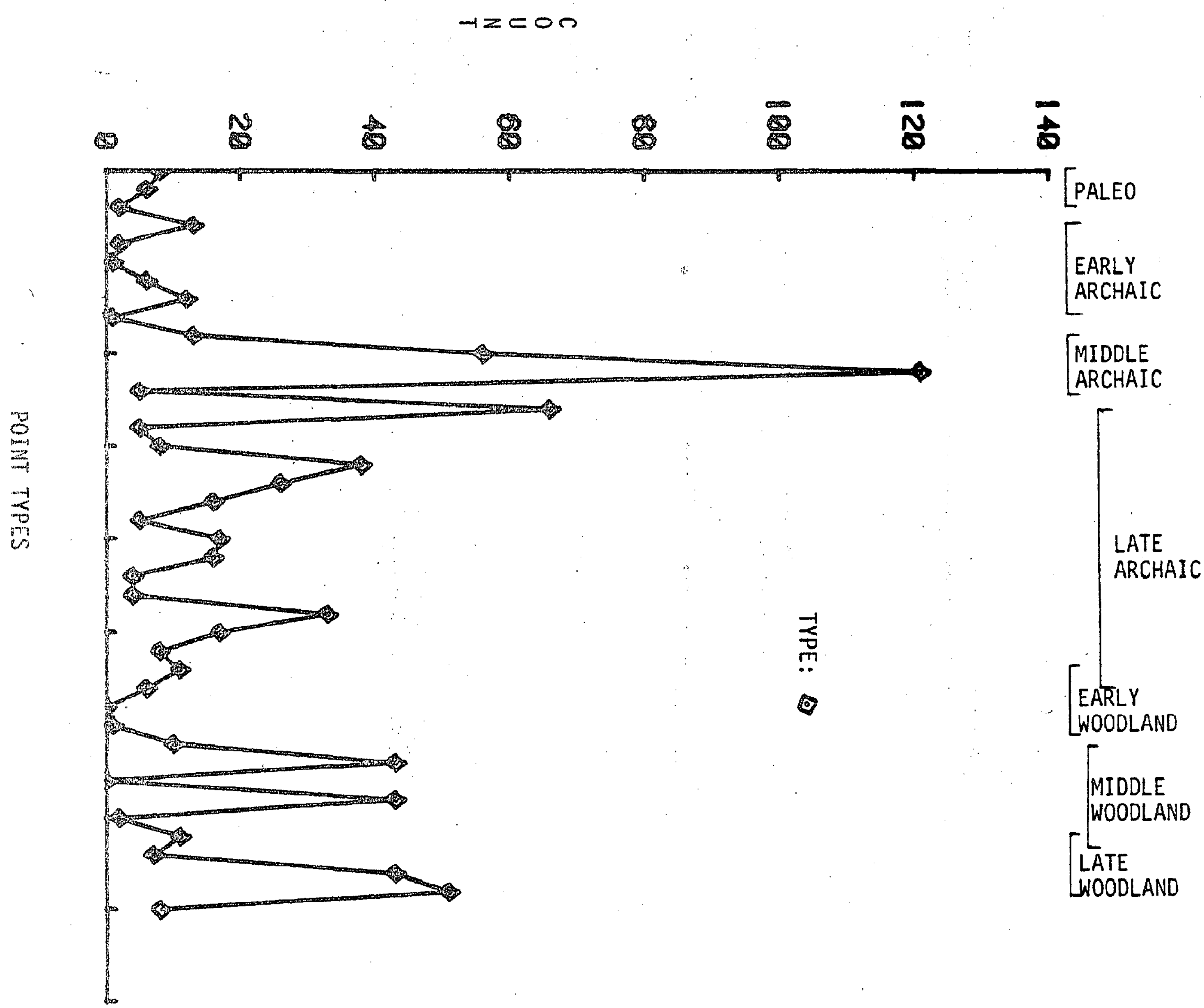

POINT COUNT BY TYPE-ALL TYPES
COUNT
130
117
104
91
78
65
52
39
26
13
0
CLOVIS
MIDDLE PALEO
DALTON-HARDAWAY
PALMER CN
KIRK CN
KIRK STEMMED
ST ALBANS
LE CROY
KANAWHA
STANLY
MORROW MOUNTAIN I
MORROW MOUNTAIN II
GUILFORD
PISCATAWAY
OTTER CREEK
VERNON
BREWERTON SN
BREWERTON CN
BREWERTON EN
BREWERTON ET
LAMOKA
HOLMES
CLAGETT
SAVANNAH RIVER
KOENS-CRISPIN
PERKIOMEN
SUSQUEHANNA
ORIENT FISHTAIL
DRY BROOK FISHTAIL
ADENA
POTTS
ROSSVILLE
CALVERT
SELBY BAY LANCEOLATE
SELBY BAY STEMMED
SELBY BAY SN
BADIN
JACKS REEF
LEVANNA
MADISON
POTOMAC
PALEO
E.A.
M.A.
L.A.
E.W.
M.W.
L.W.
POINT TYPE

FIGURE 93



POINT TYPE FREQUENCY THROUGH TIME: LINE PLOT

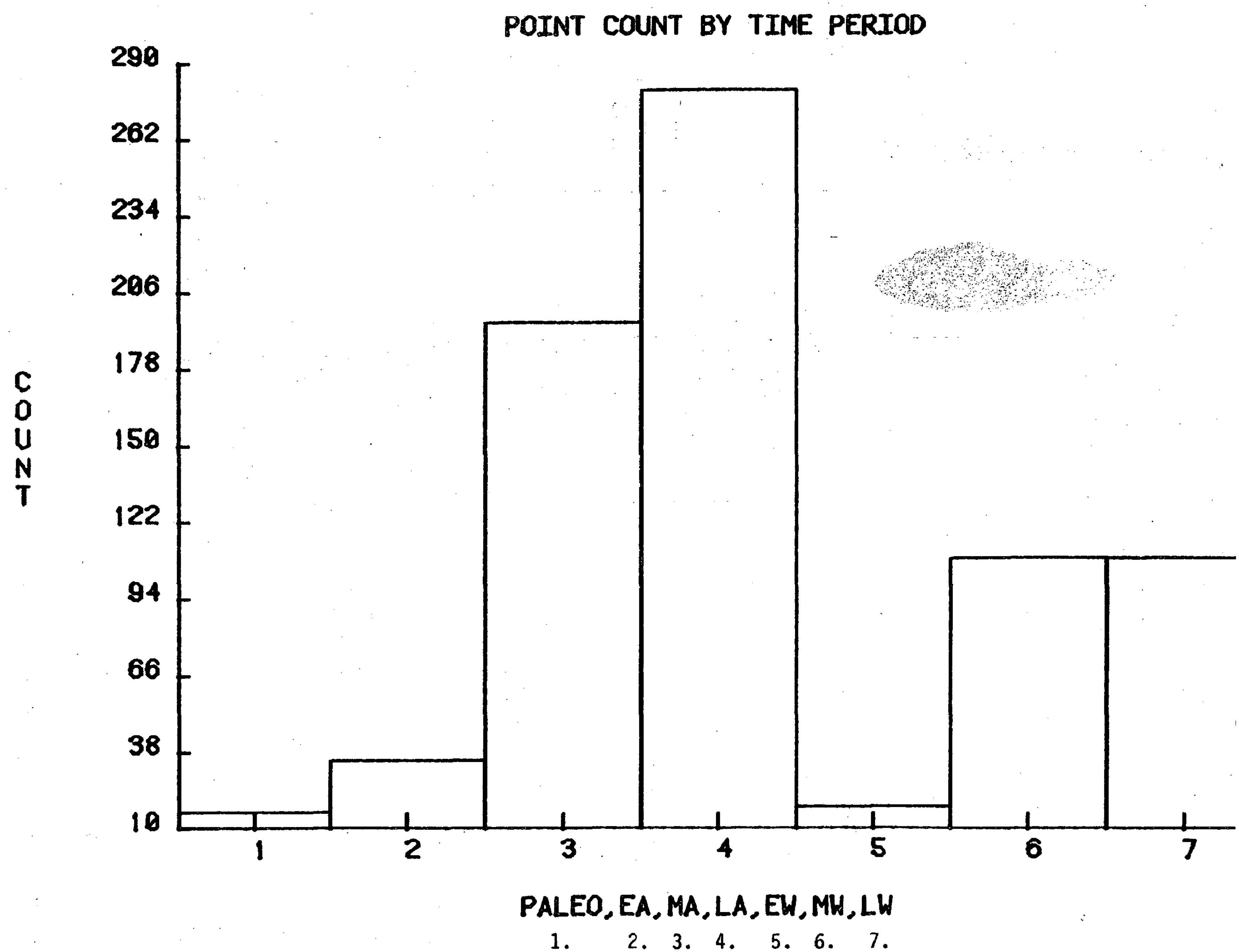

POINT COUNT BY TIME PERIOD
COUNT
290
262
234
206
178
150
122
94
66
38
10
1
2
3
4
5
6
7
PALEO, EA, MA, LA, EW, MW, LW
1. 2. 3. 4. 5. 6. 7.

FIGURE 95

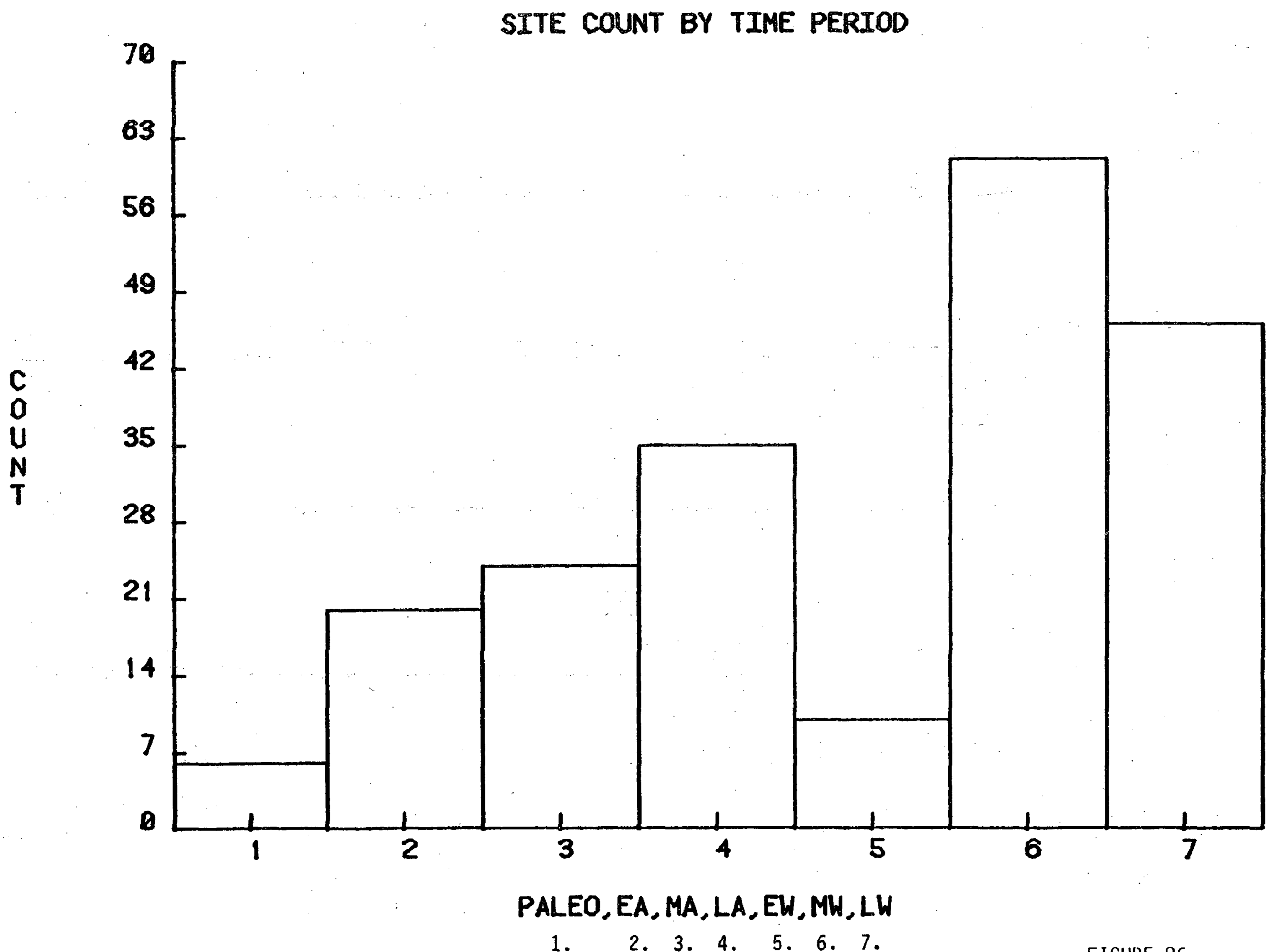
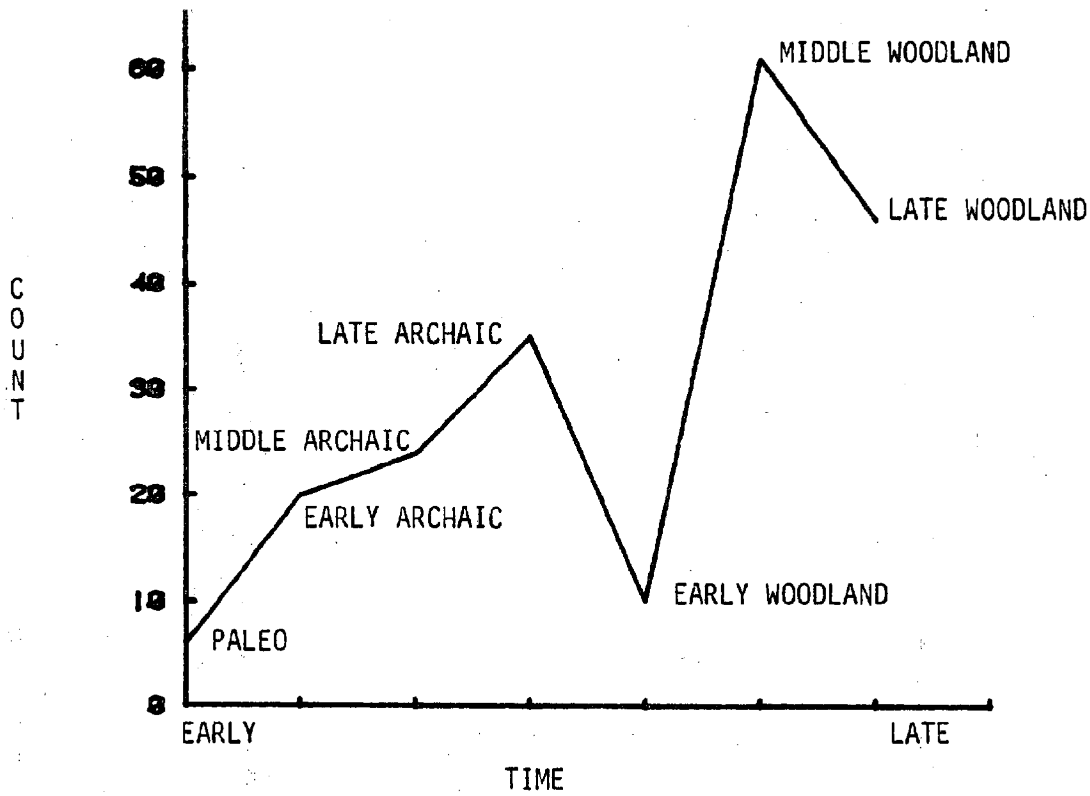

SITE COUNT BY TIME PERIOD
COUNT
70
63
56
49
42
35
28
21
14
7
0
1
2
3
4
5
6
7
PALEO,EA,MA,LA,EW,MW,LW
1. 2. 3. 4. 5. 6. 7.

FIGURE 96


MIDDLE WOODLAND
LATE WOODLAND
LATE ARCHAIC
MIDDLE ARCHAIC
EARLY ARCHAIC
EARLY WOODLAND
PALEO
C O U N T
60
50
40
30
20
10
0
EARLY
LATE
TIME

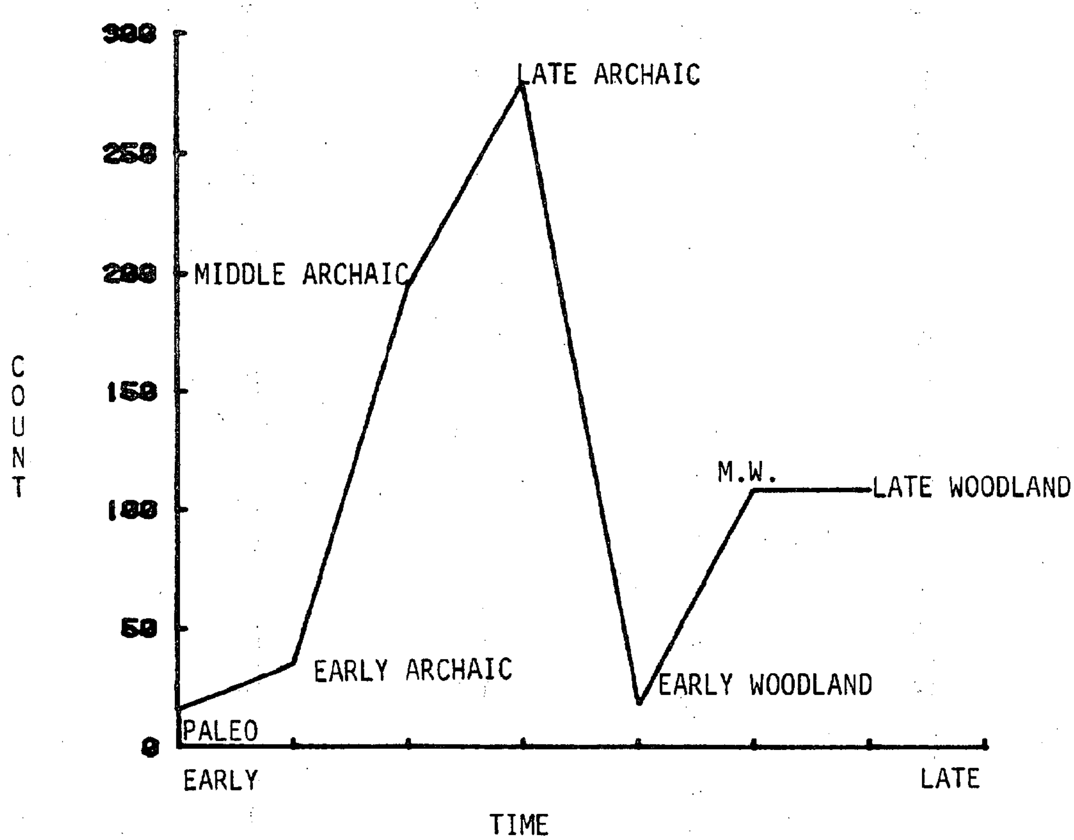

LATE ARCHAIC
MIDDLE ARCHAIC
M.W.
LATE WOODLAND
EARLY ARCHAIC
EARLY WOODLAND
PALEO
C O U N T
300
250
200
150
100
50
0
EARLY
LATE
TIME

FIGURE 97

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TABLE I.

Sites Represented in the Hirst Collection

18W064	18W084
18W065	18W083
18W066	18W080
18W057	18W076
18W047	18W074
18W037	18W073
18W035	18W072
18W034	18W043
18W060	18W0129
18W046	18W0141
18W056	18W077
18W0140	18W039
18W0142	18W071
18W044	18W069
18W097	18W059
18W0134	18W058
18W0133	18W053
18W0128	18W048
18W098	18W067
18W095	18W050
18W094	18W049
18W091	18W051
18W090	18W0131
18W042	18W063
18W0127	18W038
18W078	18W088
18W041	18W085

TABLE II.

Sites Represented in the Filmer Collection

18S065	18W025
18S044	18W0125
18S042	18W029
18S038	18W014
18S037	18W021
18S039	18W028
18S040	18W09
18S041	18W0126
18S066	18WC9
18W025	Filmer

TABLE III.

Sites Represented in the Messick Collection

18S08	18S05
18S07	Eldridge France Marina
18S021	Geanquakin Creek

TABLE IV.

Sites Represented in the Vaeth Collection

18WO143	Dickerson
Fleming	Spencer Lee

TABLE V.

Sites Represented in the Pusey, Dinwiddie, Omwake, Moore, Delano, Beauchamp, Fehrer, Goldsborough, and Maryland Geological Survey Collections

18WC2	18WO138
18WO11	18WO23
18WO130	18SO70
18WO136	18SO68
18WO135	18SO69
18WO137	Whiton Crossing
18SO71	

APPENDIX I

Site Reports on File
At the
Md Historical Trust

A P P E N D I X I I

APPLICATION OF SELECTED REMOTE SENSING TECHNIQUES TO THE ARCHAEOLOGY OF MARYLAND's LOWER EASTERN SHORE:

In his very infomrative book, Flights into Yesterday, Leo Deuel (1969) discusses how by its nature and purpose--and almost by definition--archaeology belongs to the ground. He speaks of the generations of archaeologists who have spent countless hours on hands and knees troweling, shoveling, trenching and tunnelling in order to locate the lost chapters of human history and finds it hardly surprising that in the popular mind and literature archaeology has come to be solely associated with excavation. But archaeology, both as an adventure and as a science, has come to be asking questions which Schliemann or Carter would never have dreamed of.

Deuel (ibid) emphasizes that, while digging will always play a major role in archaeology, it is no longer the be all and end all it once was. He sees this change reflecting the fact that modern archaeologists no longer search for beautiful isolated objects to fill museum cases, but rather for entire cultural units as they existed in a whole environmental and social landscape. The single site can no longer be the largest object on which we focus our attention. We must tune our eye to see a whole way of life which included the physical, technological, and functional setting within which these people lived.

With this in mind it is perhaps not surprising that archaeologists should take to the air and even outer space in order to open up their vistas over what the ground observer can see. From above one can often get very close to seeing entire cultural contexts as they fit into the whole of the prehistoric landscape and one can get a much clearer picture of the environmental processes which have and still are shaping this landscape, such as sea level rise and its associated shore transgression and inundation and the work of man himself in altering the land's face. O.G.S. Crawford, the great British archaeologist who more than anyone else developed the techniques and showed the value of aerial archaeological survey, gave a fitting example when he compared the view of an Oriental carpet as gained by a cat lounging on it by the fireplace, with that of his master standing above it. The carpet is only a disconnected series of dots and stripes to the cat, but to his master above these dots and stripes merge into a beautiful and harmonious whole.

In the hopes of securing a better understanding of the very extensive "cultural carpet" of Maryland's lower Eastern Shore, the Lower Delmarva Archaeological Research Center and the Coastal Zones Management Unit decided to perform a number of test photographic flights in combination with a program begun with the geography department at Salisbury State College of utilizing computer generated maps from NASA's orbiting Landsat earth resources satellite. It was hoped that the two sources of data would combine to give a much more thorough picture of the region's prehistoric and historic resources and their relations with the physical environment.

All archaeological marks picked up from the air are reflections of dislocations of the earth by man during past ages. The way these dislocations reveal themselves on aerial photographs can be summarized by three basic categories:

1. The first of these is <u>shadow sites</u> or <u>shadow marks</u>. These depend on the fact that if struck by the proper angle of light, any depression or bump in the ground will cast a shadow which is visible from above. The effect can be striking as even minute irregularities suddenly emerge sharply defined by black shadows. For such sites to reveal themselves the flight must be carefully timed so as to catch ideal conditions of light angle and bearing. For the low oblique lighting necessary, flights must be made in the morning or evening hours. Different films such as infrared will often accentuate the feature.

2. The second category is <u>soil mark</u> sites. These sites are revealed when freshly disturbed earth shows areas of either lighter or darker soil than the surrounding matrix. All archaeologists are familiar with the processes which lead to the formation of tell-tale soil color differences in cultural features and they need not be discussed further here. Again, infrared can aid in separating cultural soil marks from non-cultural ones. Deep plowing can destroy soil marks rapidly.

3. The third category is the crop mark site. The mechanism is similar to the soil mark process but here the modified soil reveals itself through vegetation rather than directly in the soil. Plant growth differentials reveal themselves either by color or physical form or commonly by both. The plants act in effect like a photographic developer. Soil disturbances can work either to be harmful or beneficial to plant growth. In areas where improved soil fertility or moisture retention is present, such as over a filled-in trash pit, the result is referred to as positive crop marks; while areas of reduced fertility or moisture are referred to as negative crop marks. Landsat images are revealed by different processes which will be discussed later.

It must be borne in mind that any or all of these marks can be caused by natural or recent activities and it is here that the skill of the archaeologist is called upon to recognize the true ancient landscape. A thorough knowledge of the areas of archeology,geology and palaeo-environment is a necessity. Final determinations should always be made by on-site examination whenever possible.

The detection of all three categories of marks is greatly enhanced by the application of specific techniques which have over and over been proved of great value. These techniques should include multiple flights over the same area at different times of the year and at different times of day. Crop marks are especially responsive to conditions of drought and this summer's unusually dry weather was a large factor in encouraging our own program. Selection of film types for the marks expected can be critical. For example, the use of infrared film can detect anomalies in portions of the electromagnetic spectrum which would be invisible to regular film or the naked eye.

In addition to site discovery, aerial photographs and Landsat images can be very valuable in predicting where unknown sites should be. For example, it was found that ancient river and stream beds as well as areas of poor drainage often are revealed very clearly in the aerial photographs. It is highly probable that early man would have been attracted to these watercourses and that sites should be associated closely with them.

Colonial field boundaries and alignments often reveal themselves in present fields which are in no way aligned with the original landholdings. Old roads and house foundations emerge clearly.

Landsat data has been especially valuable in site prediction based on geological variations such as the high correlation of prehistoric sites with Parsonsburg sand ridges. Cross checking of Landsat images with aerial photos has shown a very accurate detection rate on the Landsat maps. The sand ridges can be clearly identified for large areas where no accurate geologic information is available, such as Somerset County, and then be used for predictive model formation and cultural resource management needs.

The Landsat Earth Resources satellite orbits the earth at an altitude of approximately 570 miles circling the globe 14 times daily and overflying any one locale once every 18 days. Such continuous and systematic a survey offers vast potential for the application of this data, in the form of computer generated images, to all areas of cultural resource management. Environmental areas can be studied in great detail and any on-going changes occurring in these areas can be examined to predict rates of change (such as shoreline erosion and inundation or commercial development) and identify areas needing immediate attention.

The information which Landsat produces is generated not by a camera, but by an instrument known as a multispectral scanner. This scanner acquires data in two visible and two infrared portions of the light spectrum and sends it to earth at the rate of 15 million bits per second. Since this data is in a computer-compatible format, the information can be manipulated and analyzed statistically in order to isolate any specific variables which one may be interested in. With this capability in mind, a program was initiated to identify variables associated with known archaeological sites which had been identified during the course of this summer's work. As has been discussed previously (see Chapters VII and VIII), some preliminary variables which seem to be closely associated with prehistoric archaeological site occurence are: presence of Parsonsburg Sand ridge formations; close proximity to water, especially at stream junctures; and presence of swamp areas, especially in association with the previous two variables. Once these variables were identified, a program was initiated to see if Landsat data could be used to identify them and then generate maps showing where these variables occur within the study area. While our results are preliminary at this stage, we are so far encouraged by the information generated. Identification of sand ridge formations, swamps and watercourses has proved to be possible and highly accurate when checked against both low and high level aerial photographs and on the ground inspection. The possibilities for cultural resource management which this technique offers are very exciting. It seems possible that areas faced with development can be inspected, at least on a preliminary basis, for probable cultural remains in a quick, efficient and economical manner. As the techniques are refined and further variables affecting site location and identification are discovered, even more accurate use may be made of Landsat information.

To demonstrate one application of this technique, a test was run which is presented here. First, an area of known high archaeological site occurrence was studied in order to identify the variables associated with these sites. The variables identified were those listed above. Second, another area with a similar environmental makeup was selected where very little collector activity had occurred and therefore few archaeological sites were known (seven in this instance). This provided a test area where known variables could be looked for using the computer generated maps. The 7 known sites provided some basis of control in the application of variables from another area.

It is felt that the test run has resulted in the identification of numerous probable archaeological site locations within the test area. The control sites were easily identified using the previously selected variables.
It is hoped that research on the Pocomoke River drainage due to be conducted next summer will allow extensive on the ground checking of the identified probable site locations. A brief one day survey of a sample of the Landsat identified probable site locations showed prehistoric artifacts present on the majority of the checked areas and it must be kept in mind that these checks were very cursory in nature.

Preliminary results and maps are presented here. Probable site locations are identified by being circled in red. The symbol # (number) here used designates Parsonsburg Sands formation; a blank designates swamp areas, and ' designates high moisture levels such as in extremely waterlogged areas or open water.

Further ground inspection of probable sites will be necessary to test for possible problems in site identification. These problems could include such things as known sites being mis-mapped on the U.S.G.S. quadrangle sheets on file at the Maryland Geological Survey. These sites are often located by a general verbal description from the collector and this procedure can produce discrepancies. A further problem in testing our Landsat data against known sites is the fact that some of the sites shown on the Maryland Geological Survey quadrangles could have been destroyed by plowing, quarrying, construction, etc. or the sites could be obscured by heavy vegetation. Further, many of the quadrangles are out of date (some being compiled as early as 1942). This causes difficulty in located sites on the ground as many mapped landmarks have since disappeared. Solutions are being devised to overcome these problems and further work should eliminate or reduce these to manageable levels.

KEY TO LANDSAT IMAGE TEST RUN

- URBAN AREA

- RECORDED (KNOWN) SITE WHICH DID NOT PRODUCE CHARACTERISTIC SIGNAL (This could result from site destruction, mis-mapping or other causes).

- RECORDED SITE RECOGNIZED BY CHARACTERISTIC SIGNAL(S).

- UNKNOWN SITE RECOGNIZED BY CHARACTERISTIC SIGNAL(S). (Artifacts recovered during on-site investigation).

- POCOMOKE RIVER

* Landsat images were compared to the 7.5' U.S.G.S. quadrangles for Whaleysville and Ninepin.

IMAGE FOR FIELD 1